

MARINE REVIEW.

VOL. XII.

CLEVELAND, O., NOVEMBER 28, 1895.

No. 22.

Capacity of a Modern Lake Ship.

A circular to stockholders of the Mutual Transportation Co., who are given preference in the matter for subscribing for new stock in the big vessel just purchased from the Globe Iron Works Co., contains the following estimates of capacity of the new ship at various stages of water:

Draft.	Capacity.
14 feet 6 inches.....	4,180 net tons.
15 feet.....	4,450 " "
15 feet 6 inches.....	4,672 " "
16 feet.....	4,990 " "
16 feet 6 inches.....	5,264 " "
17 feet.....	5,539 " "
17 feet 6 inches.....	5,815 " "
18 feet.....	6,095 " "
18 feet 6 inches.....	6,385 " "
19 feet.....	6,680 " "

This new vessel, the largest as yet laid down on the lakes, will be considerably larger than any of the freighters that are placed in the 400-foot class. There has been some question about the hull dimensions, size of engines, etc., and we reprint these particulars as obtained from the builders. She will be 432 feet overall, 412 feet keel, 48 feet beam and 28 feet depth of hold. Her triple expansion engines, which are already practically completed, have cylinders of 24, 39 and 63 inches diameter and 42 inches stroke. Boilers will be four in number, each of 10 feet diameter and 11 feet 8 inches length, allowed 160 pounds working pressure. The total heating surface is 4,336 square feet and the grate surface 160 square feet.

Put in Surface Condensers.

Some of the very best engineers on the lakes are firm in the belief that the adoption of surface condensers for harbor tugs in places like Chicago, Buffalo, Milwaukee and Cleveland, where bad river water is used in the boilers of these vessels for making steam, should be made obligatory. There are steamboat men, they say, who will tell you today that only a high-pressure engine is of any use in a tug, but this ignorance of engineering facts should not be tolerated when accidents like those that have occurred of late, involving loss of life, demand the attention of those qualified to pass upon boiler explosions and other difficulties attending the use of steam.

The recent explosion of the boiler of the tug Morford in Chicago river is attributed to the use as feed of the foul water of that stream. That this is really more than a mere theory is almost beyond argument; it may be taken as an established fact. The effect of Chicago river water upon boilers and the apparent water level are well known to all experienced engineers. The disturbances caused by its use are not so noticeable with compound and triple expansion engines, because of the relatively smaller quantity of water used in developing a given power, but with non-condensing or high pressure engines all the conditions are most favorable for mischief.

Take, for instance, an ordinary tug engine developing say 200 horse power. The water consumption in this case would probably exceed thirty-five pounds per horse power per hour, a total of 7,500 pounds in one hour, and if, as is usually the case with tugs, the boiler had to be pushed when working strong the water consumption would be probably over forty pounds per horse power. A triple expansion engine would only use at the outside twenty pounds and a compound engine twenty-five pounds per hour, and larger engines still less. So that a steamer fitted with condensing engines would require a considerably longer time to reach the same stage of "saturation," as it may be termed, than a steamer with simple non-condensing engines, although ultimately, of course, the conditions would be equal.

This, of course, refers to jet-condensing engines, such as are commonly used on lake steamers. With surface condensing engines this difficulty is avoided altogether, as the exhaust steam, after being condensed, is returned to the boiler as feed water, and thus if there was absolutely no waste the water level would remain constant.

But in the case of a harbor tug, especially in Chicago and Buffalo, and to a lesser extent in Milwaukee and Cleveland, there is actually quite a waste of steam in whistle blowing and lifting safety valves, and this must be made up by auxiliary feed, though the percentage of the total is not great and might be made a good deal less, so that on the whole it need not be seriously considered.

There would probably be a good deal of opposition to the proposal

to introduce surface condensers on harbor tugs on the lakes. It is not so long since it was considered that a high-pressure engine was the only type suitable for tug use, and in some quarters that idea still holds its ground. But it rests on no good foundation, and we have yet to learn of any owner of a tug fitted with a compound or condensing engine going back to the old style. In coastwise harbors the surface condenser is, of course, a necessity, on account of the salt water. The idea of the surface condenser is simply to keep the exhaust steam and the cooling water separate when the latter is not suitable for use as boiler feed, and it may be used in any locality or under any circumstances where the water is available to effect condensation, no matter how foul the water may be.

It would seem that tug owners would see the wisdom of adopting the surface condenser without coercion, as aside from the greater security offered they would get the benefit of much greater economy in the engine. If it be urged that the weight of apparatus and the increased boiler capacity needed to make steam with natural draft entirely is an obstacle to its introduction into tugs already in service, it may be said in reply that it will not be necessary to carry so much coal to perform the same work and that the capacity of the engine will be much increased by the assistance of the vacuum. It need not be a question of cost at all, as the condenser will pay 100 per cent. per annum on the investment merely by the saving in coal. A few feet more added to the length of stack of most of our harbor tugs would greatly improve their steam making qualities, though there might be a little sacrifice in appearance and some delay at low bridges. Higher stacks would also go a long way towards the abatement of the smoke nuisance in harbor work.

How to Obtain Life Saving Medals.

Inquiry is often heard regarding government regulations in the matter of bestowing life saving medals. From extracts of acts of congress it is learned that the secretary of the treasury is authorized to give two classes of medals to those who risk their own lives in saving or trying to save others in danger from peril of the sea, in the United States or upon any American vessel. To obtain a medal of the first class, which is of gold, it is necessary to perform an act of extreme and heroic daring. The second class medal, of silver, is given to those not deserving the first class medal. Sufficient evidence of the deed, given before a magistrate, must be sent the secretary of the treasury, Washington, D. C. Any one having a medal and performing an act that would entitle him to a second medal, will be given a bar to attach to the first, and if the medal possessed is silver, it can be exchanged for a gold medal when the number of bars will entitle the holder to a gold medal. The number of bars necessary is left to the discretion of the secretary of the treasury. When the possessor of a gold medal is credited with an additional rescue, he may be rewarded in the same manner as that followed in the case of masters and crews of foreign vessels who rescue American citizens from shipwreck.

Probably the most satisfactory steamboat service in this country is that of the Fall River line out of New York. Only a few years ago, the sight of a line of forty or fifty business men awaiting their turn to secure stateroom accommodations was witnessed only during the busiest part of the summer season, but this condition was noted only a few weeks ago on one of the vessels of this company at Fall River. Leaving New York after business hours and arriving in Boston in time for business next day, with a good night's sleep thrown in, is the attraction of this service. It is much more restful and enjoyable than the rail ride, and an orchestra on the ship furnishing delightful music is also an attraction.

A cruiser built in England for the Argentine government and named Buenos Aires has supplanted the United States cruiser Minneapolis as the fastest war vessel afloat, excluding of course, the 30-knot torpedo boats. Buenos Aires is credited by Engineering of London with having attained on trial a speed of 23.202 knots, against 23.073 knots made by the Minneapolis. Both vessels are described and reports of their trials published in two late issues of the London journal, dates of Nov. 8 and 15.

"Contractors' Methods Employed on the Great Chicago Drainage Canal" is the title of an artistic pamphlet issued by the Lidgerwood Manufacturing Co. of New York, and which contains about fifty half-tone engravings of views of the canal and machinery engaged in its construction.

Steady Platform at Sea.

An article in Cassier's Magazine for December treats of a steady platform at sea as an alleviation, if not a remedy, for sea sickness. Attempts have been made to mount guns on steady platforms, but it is not probable that suffering humanity is soon to find relief in a deck pivoted like the bowl of the mariner's compass or the swing table commonly used aboard yachts.

The first practical machine to insure steadiness of objects at sea was fitted up on a steam yacht and subjected to a laborious course of experiment by the captains of H. M. ships Vernon and Excellent, the torpedo and gunnery school ships at Portsmouth, England, as a means of mounting both searchlight projectors and machine guns. It has in consequence, been fitted to gunboats in the British navy. On the machine, as mounted on the yacht, a seat was provided on which a person could sit and observe the steadiness by looking along sights at the horizon.

"It is true" says the writer of the magazine article "that the rising

Trade Notes.

A. Cary Smith, naval architect of New York, is designing a 150-foot three masted auxiliary yacht for the Hon. William C. Whitney, ex-Secretary of the Navy.

Seven vessels are under construction at the Roach ship yard, Chester, Pa. Three are freight steamers of about 2,000 tons each, two of them being to the order of the Central Vermont Railroad Co. and one intended for Delaware river service. Two others are steam, seagoing yachts, each of about 150 length, and the two remaining craft are river barges.

Officials of the Penn. Steel Casting and Machine Co. of Chester, Pa., who were charged with fraud in connection with contracts for furnishing gun castings for the government, were discharged in the United States district court at Philadelphia a few days ago. The judge directed this action in the case without hearing any evidence in behalf of the defense. He said that the evidence presented by the United States district attor-



H. M. S. VICTORY—LORD NELSON'S FAMOUS FLAGSHIP.

and falling motion is still there, but this can be to a great extent avoided by taking a position somewhere about midway between the bow and stern. But the angular motion of the pitching and rolling is equally great in all parts of the ship, and can be escaped only by some such contrivance as here considered. A small cabin, kept steady by an apparatus of this kind, could easily be fitted on the English channel steamers, for seats in which many people would be glad to pay a high price on a rough day."

In the general shifting around of naval constructors, Washington L. Capps, secretary of the Society of Naval Architects and Marine Engineers, is detached from the bureau of construction and repair, Washington, and ordered to duty at the Union Iron Works, San Francisco, as superintending constructor of the two gun boats to be built at that point. Some arrangement will undoubtedly be made to have attention given to the correspondence of the society in Washington, but it is unfortunate that Mr. Capps, who has made a most efficient secretary, is to be removed to the Pacific coast.

ney was not enough upon which to even establish a well-grounded suspicion.

W. E. Quinn, a coast pilot, sends to the Graham-Meyer Torch and Liquid Light Co., of Boston, the following extract from the log of the S. S. Storm King, date of October 28: "Off Nanset at 8:30 P. M., in dense fog, steaming slowly. Saw light two points on port bow and at the same time heard fog horn. Stopped engines and reversed full steam astern, when I saw Graham-Meyer torch, which lighted up a fishing schooner. Soon saw the sails and rigging and also several men on deck. The vessel was on the port tack standing directly across our bows. I at once put helm to starboard with engines full speed ahead and cleared the schooner by several feet. I feel positive that the torch saved the vessel from being run down."

CAPTAINS AND MATES ARE INVITED TO CALL AT THE OFFICE OF THE MARINE REVIEW AND LOOK OVER THE CHARTS AND SAILING DIRECTIONS OF LAKES SUPERIOR, MICHIGAN, HURON, ERIE AND ONTARIO, PUBLISHED BY THE HYDROGRAPHIC OFFICE.

The New Battleships.

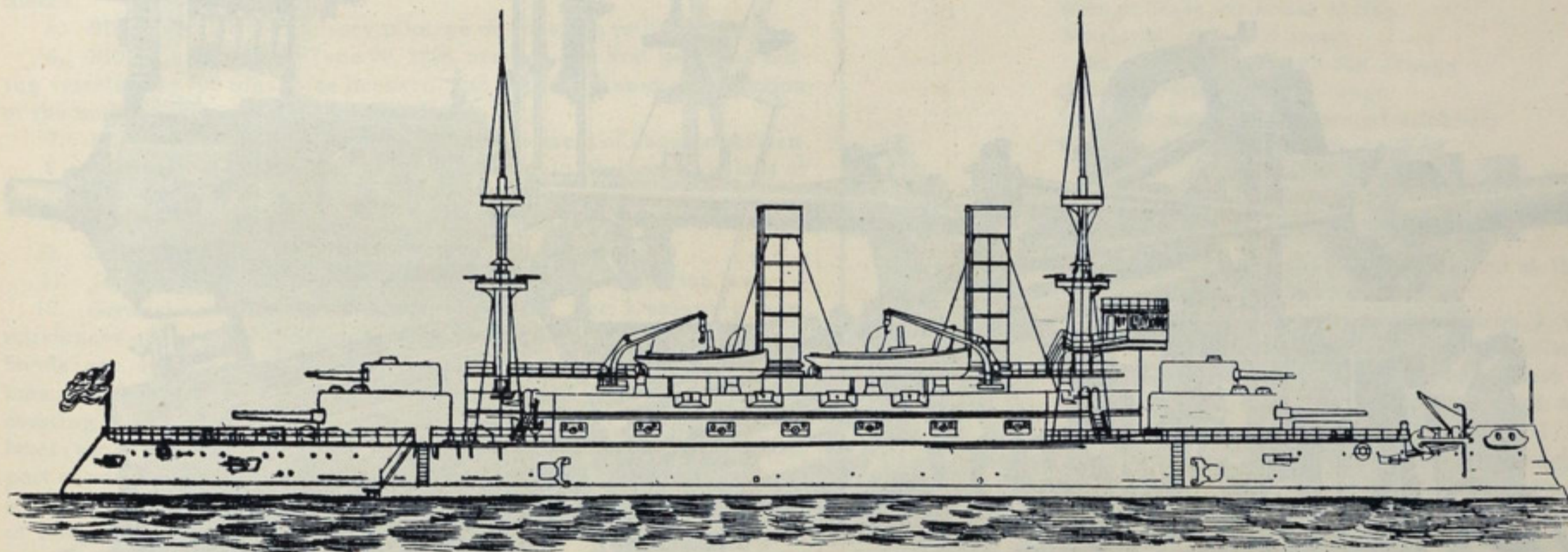
Plans for the two United States battleships, authorized by the last congress, and which are to cost with armor and armament about \$5,000,000 each, are practically completed, and an outline drawing of one of the vessels is presented herewith. Ship builders who will be asked for bids on these vessels shortly are to be given three years in which to complete them, but there will be no speed premiums, a penalty of \$100,000 a knot being imposed for failure to reach the contract speed of 16 knots. Until launched the ships will be known as battleships Nos. 5 and 6, since four other battleships were authorized before them—the Indiana, Massachusetts, Oregon and Iowa.

General dimensions and features of the ships, as designed are as follows: Length on load water line, 368 feet; beam, extreme, 72 feet 2.5 inches; freeboard forward, 14 feet, 3 inches; freeboard aft, 12 feet 3 inches; mean draught, with 410 tons of coal on board, 23 feet 6 inches; corresponding displacement, 11,500 tons; speed in knots, per hour, 16; indicated horse power, 10,000; normal coal supply, 410 tons. Batteries—Main, four 13-inch B. L. R., four 8-inch B. L. R., fourteen 5-inch R. F. B. L. R.; secondary, twenty 6-pdr. R. F., six 1-pdr. R. F., four machine guns. There will be five torpedo tubes—two on either broadside. These vessels will draw less water, when fully laden than any other first-class battleship either in this country or abroad—but 25 feet with 1,200 tons of coal on board and all stores and ammunition. Notwithstanding this the armor throughout will be very heavy and all of it will be of solid nickel steel, Harveyized. The side armor belt, for instance, will have a maximum thickness of 16½ inches, with a mean depth of 7½ feet, so disposed in reference to the load line that the vessel, with 410 tons of coal on board,

try tributary to the great lakes than has ever before been placed before the public in a single volume. Considering the great variety of subjects discussed at the convention, bearing on commercial transportation and engineering problems, it is not at all strange that some of the matter presented is of questionable utility, yet it is peculiar that the paper on "Pneumatic Locks," illustrated with a working model,—which would not work—was allowed to be eulogized by the promoters and given the tacit endorsement of the convention, when it was apparent from both the paper presented and from the model that the invention was not what it was claimed to be, viz. a balanced lock.

It is unfortunate that in public meetings like the one recently held in Cleveland visionary projects and devices of one kind and another are so dealt with as to lead innocent investors and others to suppose that the practical men in attendance see nothing to criticize in them. An examination of the paper and illustrations in the report dealing with this lock indicates that the author is certainly lacking in the first principles of hydraulics. The cross-section of lock given in the report shows the water level in the lock caisson, under a pressure of fifteen pounds per square inch, to be the same as that of the lock pit in which the caisson floats, whereas such a pressure would depress the water surface inside of the caisson about 34 feet and allow the air to escape under the lower edge of the air chamber of the elevated lock.

The argument presented in favor of the invention was that the use of connected air chambers for supporting and elevating the locks would make an ideal balanced lock. An examination of the cuts in the report shows the lower lock immersed in the lock pit, and the elevated lock supported by compressed air, or having a difference of pressure in the



ONE OF THE NEW UNITED STATES BATTLESHIPS.

will have 3½ feet of this belt armor above the water, and with 1,210 tons of coal on board will have 2 feet above the load line.

American corn-pith cellulose, recently tested with such satisfactory results, will be worked into the vessels for their entire length in the region of the water line. The use of wood is reduced to a minimum. The stateroom bulkheads will be made of steel covered with cork sheathing, and every attention will be given to lighting, heating, draining and ventilating the vessels in the most approved and efficient manner. All wood materials of every description will be tested by the electric fire-proofing process. As these ships will undoubtedly be flagships, their complements will be 520 persons—officers, seamen and marines.

Engines will be of the triple expansion type actuating twin-screws, each screw being propelled by a single engine having cylinders of 33½ inches, 51 inches and 78 inches diameter, with a common stroke of 48 inches, indicating, together with the engines for the air and circulating pumps, a collective horse power of 10,000 when making about 120 revolutions a minute. Five boilers—three double-ended and two single-ended—in four water-tight compartments, will generate the necessary steam at a pressure of 180 pounds to the square inch. A full coal supply of 1,210 tons will be carried with ease. In case of need 400 or 500 tons can be added. It will be sufficient to enable the vessels to steam over 6,000 miles, and at 13 knots nearly 4,000 miles. However, temporary provision could be made by which 400 or 500 tons extra coal could be carried, with corresponding increase in the radius of action. The description is from the Army and Navy Journal.

Dutton's Pneumatic Lock.

The report of the first annual meeting of the International Deep Waterways Association, just published, contains more valuable information relative to the commercial and transportation interests of the coun-

try tributary to the great lakes than has ever before been placed before the public in a single volume. Considering the great variety of subjects discussed at the convention, bearing on commercial transportation and engineering problems, it is not at all strange that some of the matter presented is of questionable utility, yet it is peculiar that the paper on "Pneumatic Locks," illustrated with a working model,—which would not work—was allowed to be eulogized by the promoters and given the tacit endorsement of the convention, when it was apparent from both the paper presented and from the model that the invention was not what it was claimed to be, viz. a balanced lock.

The model exhibited at Cleveland illustrated this principle so plainly that the inventor did not allow either lock chamber to be immersed so as to destroy the balance, otherwise the air pressure needed to lift and sustain the elevated lock would have forced all the water out of the operating tank. A lock such as described in the paper, having a lift of 160 feet, would require a lock pit over 200 feet deep and necessitate retaining walls of a nature heretofore never undertaken in this country.

New Stockless Anchor.

Although some lake ship builders have been buying stockless anchors in England, a better anchor of this kind than any that have as yet been seen from the other side is made in the United States. Several of the anchors referred to, the Dunn, are in use on lake vessels. The steamers Zenith City and Victory are fitted with them. One advantage of the Dunn anchor is that if the pin which holds the shank and fluke arm together should break or work loose the shank would not pull out. Vessels of the new navy are being equipped with these anchors as fast as they come out, and there are a large number of naval orders in hand now at the works of the manufacturers, the American Steel Castings Co., Thurlow, Pa. A new style of ring and shackle has been designed for lake service, so that the hawse-pipe need not be made any larger than for other styles of stockless anchors. In view of the large number of ship building orders in lake yards, and the prices at which the vessels are being built, it would certainly pay ship builders to open up a correspondence with this company.

ALL NEW HYDROGRAPHIC CHARTS ARE KEPT IN STOCK BY THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND.

Paddle Engines and Steering Gear.

The illustration on this page shows a set of compound surface condensing paddle engines to indicate 600 horse power. They were built in England and are intended for a large steamer plying in shallow waters. The high pressure cylinder is 22 inches diameter and the low pressure cylinder 43 inches, with a common stroke of 54 inches. The high pressure cylinder is arranged above the low pressure, and to suit the special requirements of the steamer the steering engine is bolted on top of the high pressure cylinder. Messrs. A. M. Rendel & Son, London, are the designers of this machinery. The illustration is from the Engineer of London.

Around the Lakes.

Major W. Stanton, corps of engineers, United States army, will succeed the late Gen. O. M. Poe on the Ohio river-Lake Erie ship canal commission.

Failure of the Vessel Owners' Towing Co., Chicago, is so complete that it is reported stockholders will lose every dollar they put into the concern and creditors will not get more than 40-per cent.

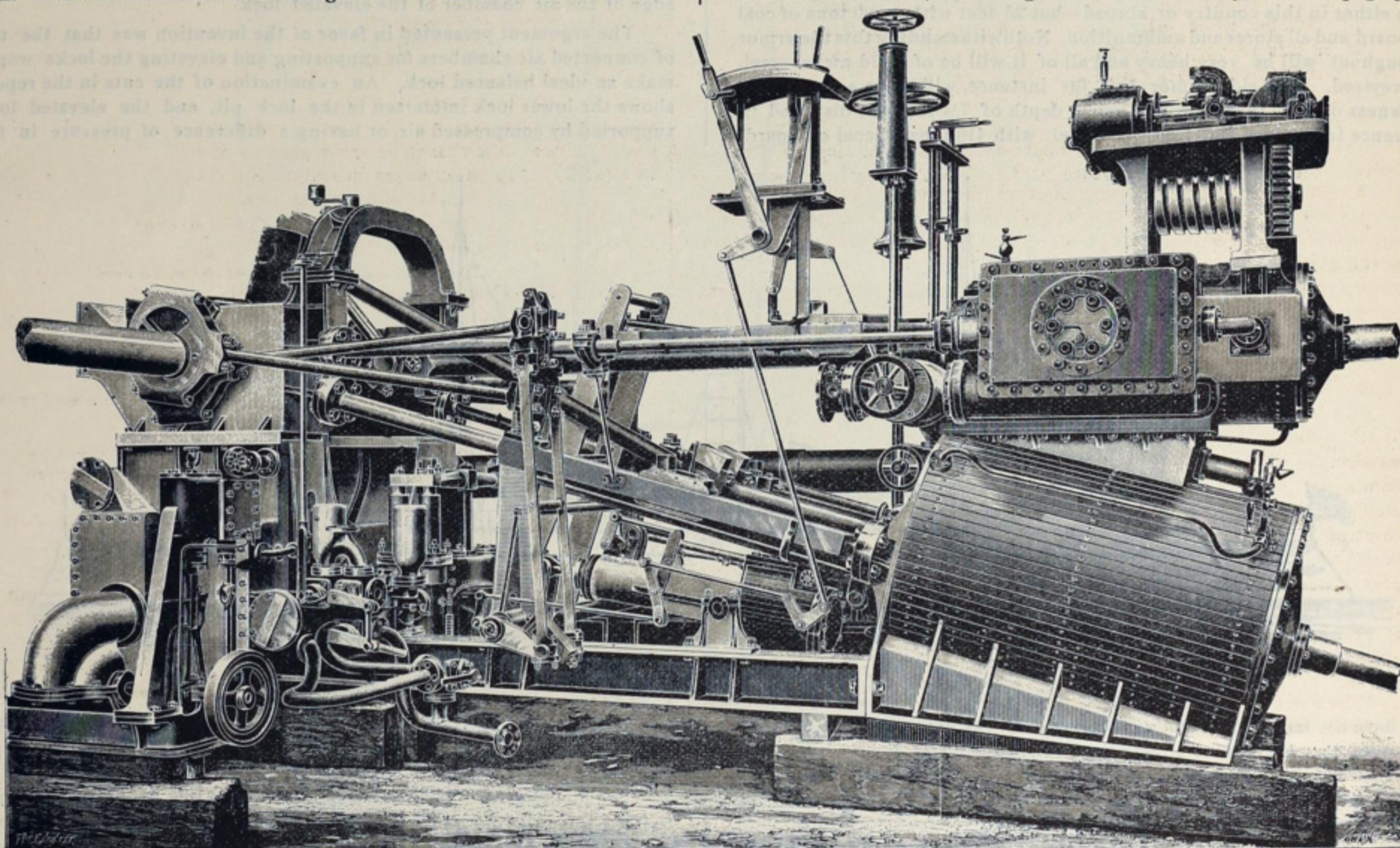
The new fog signal at Eagle Harbor, Lake Superior, is now in operation. It is a 10-inch whistle sounding alternate blasts of three and six

upper deck to the crank room floor, while the vessel was outside Grand Haven, Monday, and was killed.

The uses to which marine glue may be applied are probably not fully understood on the lakes. It can be used in connection with canvas for air-tight compartments of life-boats, and it is the best thing imaginable for caulking and paying decks. It is used in the British navy for water-proofing canvas between the double planking of vessels. The glue referred to is Jeffery's patent marine glue, and L. W. Ferdinand & Co., No. 257 Federal street, Boston, are agents for it. They will send directions for caulking to any one sending an address.

A Big Canal Project.

The projected canal between the Baltic and Black seas, which has engaged the attention of the Russian government for some time past, is a big undertaking. It would cost, including the purchase of ground, about \$96,000,000, and full five years would be required to complete the work. It would be practically a uniting of lakes, and the project is entirely feasible. The full length of canal and connecting waters is 984 miles and the proposed depth of 29 feet, with a minimum width of 220 feet on the water surface and 120 feet at the bottom. At the rate of six knots vessels could pass through the canal in six days. The topographi-



COMPOUND SURFACE CONDENSING PADDLE ENGINES.

seconds, separated by alternate silent signals of twelve and twenty-four seconds duration.

The steel tow barge Aurania of Cleveland delivered at Buffalo, a few days ago, a cargo of 141,000 bushels of wheat, which was brought down from Lake Superior on 13 feet 11 inches draft. The 400-foot steamer Victory loaded 180,000 bushels of barley at Duluth on about the same draft.

Improvements in the Portage Lake ship-canals have caused an immense increase in the traffic of these waterways, largely due to vessels going through the canals instead of rounding Keweenaw point. It is expected that the commerce of the canals this season will be double that of 1894.

The 400-foot steamer Victory, engaged in lake freighting service, has been classed by the British Corporation for the Survey and Registry of Shipping. As the rules of this association and its system of classification stand very high, this is an endorsement of the channel system of construction worthy of notice.

Thos. Pike of Buffalo, a marine engineer who has been engaged on the lakes for thirty-five years, died of pneumonia in Duluth a few days ago. His last charge was the machinery of the steamer Arthur Orr. He was in vessels of the old Union Steamboat line for twenty-five years. Another engineer, Wm. Kelley of the steamer City of Milwaukee, fell from the

cal conditions are most favorable, since they would require only one lock at each end. The canal would, besides, pass over clay soil, which would give every confidence in the security of the canal and would provide the bricks necessary for the mason work. It would be necessary to build seven great railway bridges and twenty-two roadway bridges.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on Nov. 23, 1895:

	Wheat, bushels.	Corn, bushels.
Chicago.....	21,479,000	1,139,000
Duluth.....	5,449,000
Milwaukee.....	698,000
Detroit.....	465,000	10,000
Toledo.....	1,042,000	101,000
Buffalo.....	2,264,000	216,000
Total.....	31,397,000	1,466,000

As compared with a week ago, the above figures show at the several points named a decrease of 93,000 bushels of wheat and an increase of 119,000 bushels of corn.

Shipping Measures Recommended to Congress.

One important comparison made in the annual report of the United States commissioner of navigation, Mr. E. T. Chamberlain, brings out the magnitude of lake commerce. "Our books show," he says, "that the lake shipping, on the American side, exceeds the entire shipping of any country in the world, with the exception of Great Britain and Germany. And with these exceptions, the lake shipping exceeds that of any two countries in the world, save the united shipping of France and Norway."

The report recommends the abolition of entrance and clearance fees charged to vessels trading between Canadian ports and ports of the United States on the lakes. The fee of 25 cents charged for receiving the manifest of a railroad car was abolished some time ago, and the commissioner argues that the fee of 50 cents charged for the entrance or clearance of a vessel trading between ports of the two countries should also be done away with. During the fiscal year 1894 the entries and clearances of vessels between the United States, Ontario, Quebec and Manitoba numbered 26,002, of which 11,356 were American and 14,646 Canadian. It is proposed therefore to remove government fees to the extent of about \$13,000 if the recommendation as adopted. Among a large number of measures recommended to congress for adoption are the following:

1. Free ship bill.
2. Bill extending application of the act under which the New York and Paris were admitted and the St. Louis and St. Paul were built.
3. Bill to admit certain foreign-built, American-owned steamships.
4. Bill to repeal reciprocal tonnage tax exemptions and reduce tonnage taxes within geographical limits nearly contiguous to the United States.
5. Bill to abolish compulsory pilotage on coasting sailing vessels.
6. Bill requiring, after June 30, 1898, masters and first mates of sailing vessels over 700 tons to be licensed, and requiring annual inspection of the hulls of such vessels after that date.
7. Bill to prohibit advances and regulate allotment of wages to seamen.
8. Bill to abolish imprisonment of seamen in the common jails of the United States for desertion.
9. Bill for free raw materials for shipbuilding.
10. Bill to promote repair work in American ship yards.
11. Joint resolution for printing a compilation of navigation laws.
12. General amendments to navigation laws: Sec. 1, shipping commissioners' offices; sec. 2, adequate crew spaces; sec. 3, abolition of crew bonds; sec. 4, correction of verbal error; sec. 5, wages of deceased seamen; sec. 6, sale of effects of deceased seamen; sec. 7, good conduct on coasting vessels; sec. 8, abolition of entry and clearance fees on the great lakes; sec. 9, return of American vessel to the American flag; sec. 10, report of wrecks; sec. 11, amendments to inland rules to prevent collisions; sec. 12, the same; sec. 13, stamps on foreign-made boilers; sec. 14, repeal of obsolete statute; sec. 15, repeal of 18 sections of the revised statutes apparently obsolete, unnecessary and obstructive; sec. 16, transfer of sea stores.

The free ship bill, as recommended by the commissioner, is as follows: "Vessels belonging wholly to citizens of the United States, and vessels which may be captured in war by citizens of the United States and lawfully condemned as prize, or which may be adjudged to be forfeited for a breach of the laws of the United States, being wholly owned by citizens, and no others, may be registered as directed in this title, but no foreign-built vessel hereafter admitted to American registry shall be entitled to engage in the coasting trade of the United States."

The bill to encourage American ship building is as follows: "That the commissioner of navigation be, and he is hereby authorized and directed before July 1, 1898, upon application by a citizen of the United States or a corporation organized under the laws of the United States or of any state thereof, and upon satisfactory proof that such American citizen or corporation is the owner of any steamship named in this act, to issue an American register to such vessel. No vessel registered pursuant to this act shall be entitled to engage in the coasting trade of the United States."

A Monitor for Ship's Lights.

Horace See of No. 1 Broadway, New York, has taken up another device that is especially adapted to use in connection with lights on ship-board. It is an electrical indicator that is said to give sure warning of the failure of any appliance to which it may be connected. When applied to a vessel, the pilot will at all times be informed of the condition of his running lights, both by visible and audible indications produced in the pilot house or other convenient place, so that when a lamp happens to go out, another is immediately set in glow in place of it and an alarm is set up which continues until the first lamp is restored. Thus one lamp is always in reserve. The vessel equipped with this device will have, in case of a night collision, strong evidence to corroborate that of her officers that the lights were burning. It is now in operation on a dozen or more vessels running out of New York.

"Hullo!"

When you see a man in woe
Walk right up an' say "Hullo!"
Say "Hullo," an' "How d'ye do!"
"How's the world a-usin' you?"
Slap the fellow on his back,
Bring yer han' down with a whack,
Waltz right up an' don't go slow,
Grin an' shake an' say "Hullo!"

Is he clothed in rags? O sho!
Walk right up an' say, "Hullo!"
Rags is but a cotton roll
Just for wrappin' up a soul;
An' a soul is worth a true
Hale an' hearty "How d'ye do!"
Don't wait for the crowd to go;
Walk right up an' say, "Hullo!"

W'en big vessels meet, they say,
They saloot an' sail away.
Jest the same with you an' me,
Lonesome ships upon the sea,
Each one sailin' his own jog
For a port beyond the fog;
Let your speakin'-trumpet blow.
Lift yer horn and cry, "Hullo!"

Say "Hullo!" an' "How d'ye do!"
Other folks are as good as you;
W'en ye leave yer house of clay,
Wanderin' in the far away;
W'en you travel through the strange
Country t'other side the range,
Then the souls you've cheered will know
Who you be, an' say "Hullo!"

—Sam. W. Foss in Pacific Union Printer.

Letters at Detroit Post Office.

Letters bearing the following names await owners at the marine post office, Detroit, Mich.:

Avery, H.	Gill, Thos. E.	Nicholson, J. M.
Allen, Louis	Gill, T. E.	Nicholson, Geo.
Black, T. E.	Gardam, H.	Petty, Gilbert
Black, Alex	Holder, Fred W.	Pelton, Capt. Bert
Charron, Capt. Thomas	Hunt, Capt. W. J.	Perras, W. H.
Church, Charles	Jackson, Jacob	Rogers, Henry
Carpenter, Will H.	June, Amos	Richeleau, Frank
Drouillard, Geo. H.	Leduc, George	Rumming, Jas. B.
Eaton, Hoyt,	Lyons, Capt. S. A.	Thomas, Dave
Elbe, Henry J.	Mullen, Fred G.	Townsend, Mrs. C. Owen
Feeney, Frank J.	Moar, Thomas	Wait, A. D.
Fox, Danil	Mitchell, Martin	Watson, George
Gray, W. H.	Merrill, S. G.	Ward, Mrs. Kate

In General.

A recent number of the Journalist, New York, contains an excellent portrait of Capt. Geo. L. Norton, the popular editor of the Marine Journal.

A twin-screw steel yacht, 230 feet long and fitted with quadruple expansion engines, is being built at the Jonson Engineering Works, Harlem, N. Y.

Secretary Herbert has extended the time six months for the completion of the three gunboats under contract at Newport News, in order that all the woodwork may be rendered fire-proof by impregnation with ammonium sulphate. Under the original contract the Newport News ship building company should have finished these vessels about the end of next January.

The bureau of steam engineering, navy department, has given up its efforts to obtain satisfactory nickel steel for boilers of the Chicago. A sufficient amount of this material has been assembled at the New York navy yard for the construction of one boiler, and the other will be made of ordinary boiler steel. The trouble with nickel steel is, according to the engineers, that smooth joints cannot be made.

About \$10,000 was expended in launching the first-class battleship *Victorious* in England a few weeks ago. The launching grease comprised 7,000 pounds Russian tallow, 160 gallons train oil and 700 pounds soft soap. The gross floating weight of the ship completed and ready for sea will be 15,725 tons, comprised as follows: Steel in hull, 4,560 tons; wood in decks, etc., 570 tons; fittings, 820 tons; armor, with teak backing, 3,025 tons; protective plating, 1,250 tons; machinery, 1,320 tons; armament, 1,550 tons; coal, 1,890 tons; equipment, 740 tons.



DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department on June 30, 1895, contained the names of 3,342 vessels, of 1,241,459.14 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1894, was 359 and their aggregate gross tonnage 634,467.84; the number of vessels of this class owned in all other parts of the country on the same date was 316 and their tonnage 642,642.50, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1895, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels.....	1,755	857,735.00
Sailing vessels.....	1,100	300,642.00
Unrigged.....	487	83,082.00
Total.....	3,342	1,241,459.00

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30,	Number.	Net Tonnage.
1891.....	204	111,856.45
" " " 1892.....	169	45,168.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
" " " 1895.....	93	36,353.00
Total.....	747	334,634.28

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1894.	1893.	1892.	1894.	1893.	1892.
No. vessel pass'ges	14,491	12,008	12,580	3,352	3,341	3,559
T'n'ge, net registd	13,110,366	9,849,754	10,647,203	8,039,106	7,659,068	7,712,028
Days of Navigat'n	234	219	223	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

IF THE LATEST report regarding the conclusions of the Nicaragua canal commission are found to be correct, it would seem that the projectors of the big enterprise have encountered a serious set-back. A New York paper publishes an extensive synopsis of the report, which is said to have been secured from a stenographer of the commission. It has been stated that the commission favored the route proposed by the canal company, and placed the cost of the canal at about \$110,000,000, but this latest version of the report declares that it is neither practical nor advisable to attempt the construction of the canal upon the data at present available, and that the undertaking would be fraught with hazards too obvious to disregard. That the necessary knowledge may be had of the physical and topographical conditions affecting the construction and maintenance of the canal across Nicaragua upon which to form a final judgment as to the feasibility, permanence and cost, the commission recommends an appropriation by congress of \$350,000 for extensive additional surveys and examinations, covering a period of eighteen months. With the data at hand, however, the commission makes a provisional estimate of the cost of the canal, placing the amount at \$133,472,893, or nearly double that of the Maritime Canal Co's. unconditional estimate of \$69,893,660. The general trend of the entire report is very unfavorable to the canal company. The commission presents tables comparing its own estimates of the cost of the canal project with the estimates presented by the company. The figures indicate that the project will be at least twice as expensive as the company has all along maintained that it would be.

TO THOSE who do not already file the REVIEW we would suggest the advisability of doing so in the future. The papers will prove valuable to you. Information which they contain is often absolutely necessary in the conduct of business. Within a few days past we have received orders for back numbers by long distance telephone from Chicago and by telegraph from Detroit. Hardly a day passes without inquiry, either through the mails or by personal request, for information regarding some matter that has appeared in the REVIEW. The statement may seem strange, but it is a fact, nevertheless, that a prominent vessel owner called at the office of the REVIEW recently to learn the number of hatches in his own steamer. He was a little in doubt as to this feature of a vessel that was being built for him, but he knew that a full description of the steamer

could be found in our files. As information of all kinds is sought from the office of the REVIEW, so also is information obtained from those who seek it. The news is at all times from first hands, in every way reliable, and this is why we are enabled to print a great deal of valuable reading matter that can be secured only through an information bureau like the office of the REVIEW. It is the kind of information that can not be gathered with scissors and paste pot.

IT WILL be admitted on all hands that the life saving service is one of the grandest institutions of this country, and that the example of the American people in supporting and enlarging the service might well be followed by other maritime nations, but reports sent out from Washington each year regarding the operations of the service are ridiculous and unjust to the men themselves. These reports are unjust for the reason that everybody interested in shipping understands full well that the life savers did not, for instance, save 5,382 lives out of 5,402 lives that were imperilled within the scope of the service during the year 1894. Neither did they save \$9,000,000 worth of property out of \$10,000,000 worth imperilled, as might be implied from the latest reports. Property to the value of the first named figure undoubtedly was endangered within the life saving districts, but it was saved through wrecking expeditions, salvage companies, harbor tugs, and in various other ways, and reports regarding the loss or salvage of it should not be bulked together and given out as a statement of operations of the life saving service.

GEN. CRAIGHILL, chief of army engineers, says that some time ago he talked over Gen. Poe's successor with the general himself, when the matter of the Detroit engineer's retirement was under consideration. He adds that the views expressed by Gen. Poe at that time will now be considered in the appointment of his successor. If such is the case, Col. McKenzie will certainly be appointed to the Detroit position, as there is no question regarding the choice made by Gen. Poe before his death. But a big effort is still being made in behalf of Col. S. M. Mansfield of Boston, who has the support of Don M. Dickinson and others of influence with the administration.

Timely Quotations.

Our fleet of merchant ships on the great lakes now outnumbers alone the seagoing fleet of any nation except England and Germany.—E. T. Chamberlain, United States Commissioner of Navigation.

Senator Quay's desire to devote part of the wealth of this country to the improvement of its waterways stamps him as a statesman who sees the great work of his time. The railroad system is so far developed that we know its limits. Now comes the day of improving the natural waterways with which the continent is blessed, and in some cases of making new waterways. In my opinion the growth of natural prosperity can by no other means be so accelerated and maintained. It should be the next work to which the public puts its hands in earnest. It is much more important, even, than the Nicaragua canal, important as it is also.—Andrew Carnegie.

Outside of engineering circles James Watt is little more than a name with nothing about it to inspire admiration, and if he had not had the good fortune to be a Scotchman, and thus become the object of a clannish admiration, he would be as nearly forgotten now as the Welshman Trevithick. Yet every man, woman and child of this and the last generation in the civilized world is the better for his inventions. Take a contemporary name of Watt's, that of Burns, and we find it known and admired wherever the English tongue is spoken, and far beyond the limit. He provided nothing new to help widen the scope of intellectual vision; the things he sang about were in the field and in the town, full in the sight of all, and only became bright from the charm and beauty of his setting. Yet, when touched by his inspiration they became a treasured possession of mankind, never to be abandoned or forgotten until human nature changes, of which there are no signs. The magnificent benefits that have resulted from Watt's inventions being material, do not touch the heart of mankind, and therein lies the difference.—George W. Dickie.

For ten years or more past, since steel was first used in the construction of lake vessels, the custom has been to equip the best vessels with a steam windlass forward and steam capstan aft. Although the size of vessels has been steadily increasing during this time, from 250 feet to 400 feet or more in length, the steam windlass and steam capstan has been depended upon for the various purposes to which they are applied. Improvements have, of course, been made in these machines, but on the 400-foot steel ships that will be quite common next season extra machinery for use at docks and in port generally is being adopted. The big steel freighter Zenith City has two extra steam dock capstans on deck, and the more progressive managers of the modern steamers, who realize the great advantage of time gained in port, will probably follow suit in this matter.

A dividend of \$2 a share was paid yesterday, the 27th, by the Lake Superior Iron Co.

A view of the interior of the store of Russell & Watson, No. 145 Main street, Buffalo, is shown herewith. In addition to the display of signal lamps, this firm manufactures a special steamboat range. They have placed enough of these ranges on steamers to learn just what is needed for the service. They own the right to manufacture the Walters' range grate, which is a great improvement over the old style. The store illustrated was occupied this spring, increasing business necessitating a



The annual statistics of the Bureau Veritas (French society for the classification of ships) relating to the mercantile navy of the world give the total number of sea-going sailing vessels now afloat measuring over 50 tons as 25,570, with an aggregate tonnage of 9,323,995 tons. Of this number, Great Britain comes first with 8,793 ships of 3,333,607 tons. The United States is second with 3,824 vessels and 1,362,317 tons. Norway is third, with nearly 1,000 less vessels than the United States, but nearly the same amount of tonnage. France occupies only the eighth rank, between Sweden and Greece. In regard to the steamers, England counts 5,771 vessels with nearly 10,000,000 tons. Germany, which comes second, has 826 steamers of 1,306,711 tons, France third with 501 steamers and 864,598 tons, while the United States holds fourth place with 447 steamers and 703,339 tons.

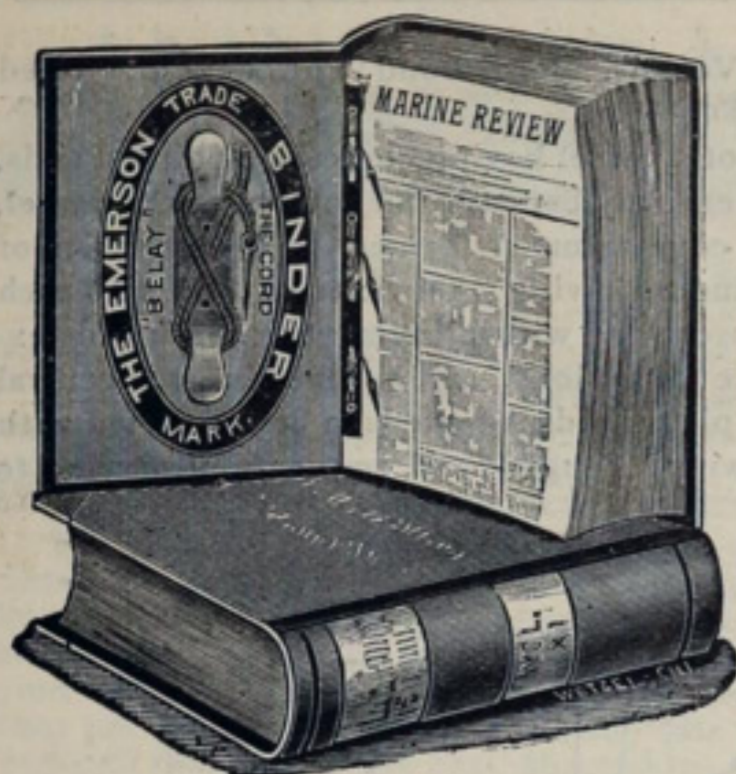
SELECTED ABSTRACTS OF SPECIFICATIONS OF A MARINE NATURE—FROM
LATEST PATENT OFFICE REPORTS.

Claim. Steering gear for ships or boats consisting of a tiller fixed to the rudder head, a chain wheel set eccentrically upon a driving shaft and a chain passing around the eccentric, the ends of the chain being connected respectively to arms on the tiller.

Claim. In an electric steering gear, the combination of a steering engine, a valve for controlling the same, an electric motor mounted upon or adjacent to said steering engine; connections between said electric motor and said steering engine, whereby when said electric motor is operating the said valve will be kept constantly open, differential connections between said steering engine and said valve tending to constantly close the valve when the engine is operating; a revolving switch having independently moving contact arms at the bow of the vessel; a circuit or circuits from said switch to said electric motor; means for operating said contact arms, whereby said circuit or circuits will be constantly closed; a second electric motor in the last named circuit or circuits, connected with the switch at the bow of the vessel and tending to constantly break the circuit of the main electric motor; and, mechanical connections between the steering engine, and a switch thereon tending to constantly break the circuit of the second electric motor.

Claim. The combination, of a vessel having conical or pointed ends, open-ended tubes or cylinders entirely beneath the bottom of the vessel, one at each end and a central compartment formed by a depression of the bottom, said tubes or cylinders having their axes in line with each other and having pistons reciprocating within them, with their rods extending inwardly from opposite directions, and engines in said central compartment in line with the piston rods, adapted to be connected with said rods, one of said pistons with its engine and connections serving to

Claim. In a life preserver, a flexible water-tight pantaloons suit, a continuous tubular inflatable float body encircling the upper part of said suit and disposed at an oblique angle to the length of the suit, and positive fastening means for connecting the float body with the pantaloons suit and maintaining the same relatively so disposed to each other.



ONE OF THESE BINDERS

that will hold 52
NUMBERS
of the

MARINE REVIEW,

Will be mailed to
any address on
receipt of \$1.

MARINE REVIEW...

516 Perry-Payne Bldg.,
CLEVELAND, O.

The Roberts Boiler Co.

Have built 600 BOILERS TO DATE for...

Launches, Yachts, Passenger and Freight Steamers, Dredges, Tugs, Stern-Wheelers, Canalers; also for Navy Department, War Department, Treasury Department, Light-House Board and Revenue Cutter Service; also for N. Y. Dock Department and N. Y. Harbor Quartermaster.

...SAFETY AND ECONOMY...

Never killed a man or had a serious accident. \$250,000 capital. Works covering 29,000 square feet of ground. Never had a boiler returned on account of dissatisfaction. Every Boiler Warranted. All material made specially for our use. All boilers tested at 500 pounds hydrostatic pressure and 250 pounds of steam before shipping. Workmanship strictly first-class. All joints screwed and reliable. No expanded joints. State your requirements and we will furnish specifications. Correspondence solicited.

THE ROBERTS SAFETY WATER TUBE BOILER CO.,

39 and 41 Cortlandt Street, New York City.

Works, Red Bank, N. J.

For Sale A Double Furnace Marine Boiler,

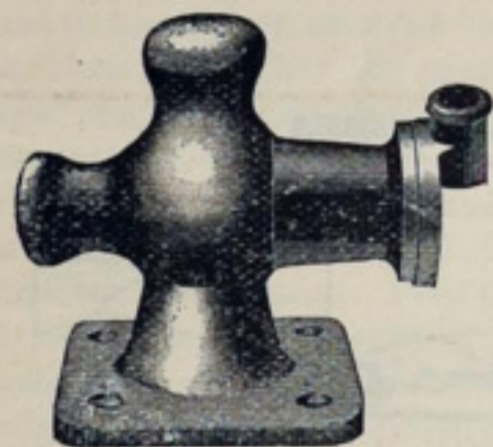
11 feet diameter by 14 feet long, and 120 pounds steam.

In good condition, built by the Globe Iron Works, Cleveland, in 1891.

Address: GOODRICH TRANSPORTATION CO., CHICAGO

Enos Combined Bitt, Winch and Sheet Holder.

Patented U. S. A., England and Canada.



Takes the place of wooden or iron bitts and forms a Combination Bitt and Winch. Takes up less room than the ordinary bitt. Can be used to great advantage as a Windlass or Sheet Holder on Yachts. An examination will convince you of the many uses to which it can be put.

FOR SALE BY

H. Channon Company, Chicago, Ill.
Upson, Walton & Co., Cleveland, Ohio.
Howard H. Baker & Co., Buffalo, N. Y.
M. I. Wilcox Cordage & Supply Co., Toledo, O.
H. D. Edwards & Co., Detroit, Mich.
Henry Beckman & Son, Erie, Pa.
And by Ship Chandlers in every seaport city lake port and town.

THE ENOS SHEET HOLDER CO.

Manufacturers and Proprietors, PEABODY, MASS.

AN ARTISTIC PHOTO OF THE NORTH WEST, HANDSOMELY MOUNTED, SENT TO ANY ADDRESS FOR 50 CENTS, BY THE MARINE REVIEW. MONEY RETURNED IF YOU ARE NOT SATISFIED.

For Sale Cheap

particulars address:

Several tugs with engines all the way from 10x12 to 20x20 and all in good repair. For full

INMAN TUG LINE,

B. B. INMAN, Manager, Duluth, Minn.

For Sale Cheap ...FOUR HARBOR TUGS,

ALL WITH ENGINES 18x20, AND IN GOOD CONDITION.

HIGGIE & SHAW, Vessel Agents,

No. 1 Franklin Street, CHICAGO, ILL.

Jeffery's Marine Glue

For Paying Seams of Decks and other purposes.

L. W. FERDINAND & CO.,

Boston, Mass.

Send for Circular.

DUNFORD & ALVERSON,

PORT HURON, MICH.

Length, 400 feet,

Width:

On top, 95 feet,

Bottom, 55 "

Gate, 62 "

Depth:

To Floor, 20 ft.

To Sill, 18 ft.

On Blocks, 16 ft.



Dry Dock large enough to dock the largest steamers on the lakes. Docking, Repairing and Spar Making. Dock has pit to ship rudders.

THIS IS THE NEAREST MODERN DOCK TO THE SAULT OR MACKINAW.



NAUTICAL WATCH CHAIN.

Solid Gold. Ship-shape in every detail. Send for Descriptive Circular.

MORGAN A. ROBERTSON,

26 John Street,

NEW YORK.

To Vessel Owners and Captains

Look out for **Graham's Coal Dock**, foot of 21st St., Detroit.

1,000 Tons, best quality, on hand all the time **Fresh on Cars.**

You can get it from **Chutes, High Platform or Dock.**

Chutes fit highest or lowest boats, and can give as quick dispatch as at any dock. Widest point on the river, and nothing to interfere in rounding to with tows.

No Car Boats, Ferry Boats or Elevators in the way.

Ten Minutes Ride to City Hall. Supplies right at hand.

TELEPHONE 2083, OR WRITE

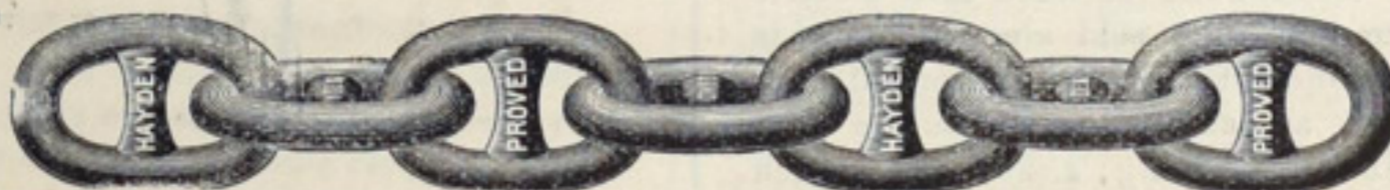
JAMES GRAHAM,

DETROIT, MICH.

Chain Department * P. HAYDEN S. H. CO. * Columbus, Ohio.

Our Chain in use on the Largest Steamers on the Lakes:

The Zenith City, Victory, North West and North Land, and many others.



All kinds of Chain—

Stud and Close Link, Cable Chains.

Write for Prices.

AMERICAN SHIP WINDLASS CO.

P. O. BOX 53, PROVIDENCE, R. I.

BUILDERS OF THE

"Providence" Windlasses and Capstans

350 STYLES AND SIZES.
OVER 5000 IN USE.

SEND FOR CATALOGUE.

FRANK S. MANTON, AGENT.

The Marine Manufacturing & Supply Co. 158 South St., NEW YORK.

Manufacturers and dealers in Ship Machinery, Windlasses, Capstans, Winches, Pumps, Brass Work, "Monitor" Side and Deck Lights, Cannon, Rails, Stanchions.
Ship Chandlery and Engineers Supplies, Cordage, Oakum, Wire Rope, Anchors, Chain, FLAGS AND SIGNALS, Hose, Packing, Oils, Waste, etc., etc.

Estimates furnished for complete outfits for vessels.

GRAHAM-MEYER TORCH and LIQUID LIGHT COMPANY

89 Fulton St., Boston, Mass.

MANUFACTURERS OF

Torches and Liquids for Lights of Various Colors,
For Signal Lights and Illuminations of all kinds.
Blue Flash Lights a Specialty.

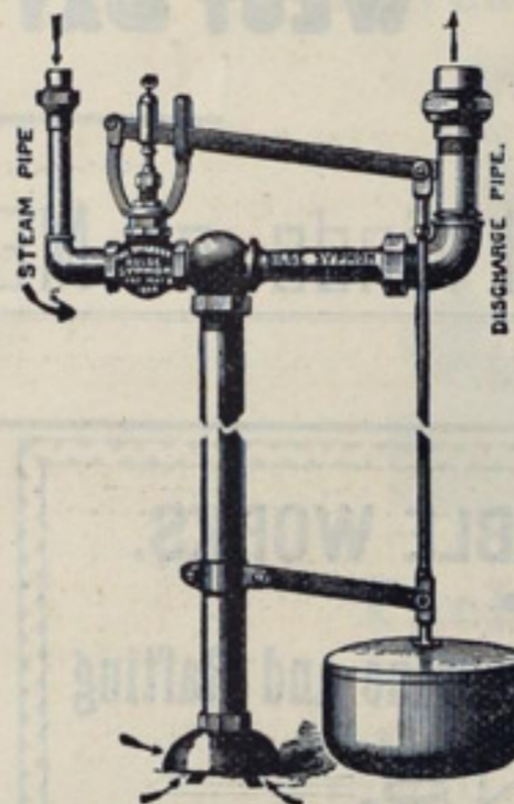


We call the attention of masters of vessels to the efficiency of our patented flare-up or flash light torch. It can be used with kerosene or spirits of turpentine. Its superiority over all other kinds of torches is that it is indestructible. Being filled with asbestos, it will last for years, and is ready for use at any moment. It gives a white flame three to five feet high, burns less liquid than any ordinary torch of the same size or larger. The combustion is so perfect that very little smoke is made, and the flame is therefore much brighter. At night you can wigwag with this torch. Rain or spray will not extinguish it, and the stronger the wind the better it burns. We have also a **Blue, Green and Red Burning Liquid**, to make any code of signals required. Yachtsmen will find this of immense value for signaling.

Lake Agents: { The Upson-Walton Co., Cleveland, O.
H. Channon Co., Chicago, Ill.

Price of Flare-up Light, \$3.50

THE BRAENDER AUTOMATIC BILGE SYPHON,



Always on Watch,
"SHIP AHOY."

It never tires, or goes to sleep, and is reliable at all times.

It is the best, cheapest and surest way of keeping your vessel dry.

They are indorsed by leading Engineers throughout the country.

They commend themselves wherever placed. A dry bottom in ship's holds gains speed, which is equal to money.

By giving it a trial, it will speak for itself. Write for circular,

PHILIP BRAENDER,
261 West 118th Street, - NEW YORK.

THE BABCOCK & WILCOX CO. FORGED STEEL WATER-TUBE MARINE BOILER,

29 CORTLANDT ST., NEW YORK.

BOILERS SOLD TO STEAMERS

**NERO,
TURRET CROWN,**

**ALGERIE,
HERO,**

**ELEANOR,
TURRET CAPE,**

**REVERIE,
SENECA,**

**TROPHY,
PRESIDENT,**

**SCOTTISH HERO,
ZENITH CITY.**

Under construction:—For Plant Line Steamship, building by the Newport News Shipbuilding and Dry Dock Co., eight (8) boilers with 20,300 sq. ft. heating surface and 460 sq. ft. grate surface; pressure 200 lbs. per sq. in.

C. S. Richardson Fueling Co.

FUELING DOCKS:
FOOT OF NORTH MARKET ST.
18TH STREET BRIDGE,
ILLINOIS CENTRAL SLIP 'C'

STORAGE DOCKS FOR ANTHRACITE:
KINGSBURY ST. BETWEEN INDIANA & ERIE STS.
ELSTON AVE. DIVISION ST. BRIDGE (NORTH BRANCH)
NORTH AVE. BRIDGE.
DIVISION ST. BRIDGE (OGDEN CANAL)
SOUTH HALSTED ST. BRIDGE.

COAL

OFFICE,
225 DEARBORN ST.

CHICAGO.



The Vanduzen Steam Jet Pumps

Are the Cheapest and Most Reliable Pumps in the world. Cannot get out of order, nor freeze up, nor clog.

The Most Effective, Reliable and Durable.

Cost only from \$7.00 up to \$75.00. Capacity from 250 to 12,000 gallons per hour. For STEAMBOATS, BARGES and VESSELS of Every Description. Price, Catalogue, etc., Sent Free.

We are also founders of the Highest Grade, Finest Quality

BELLS FOR STEAMBOATS, TUGS,

Barges, Ferry Boats, Sailing Vessels, etc.

Our Bells are of approved workmanship, and of the BEST MATERIAL, and of full, clear tone, and will always pass Government inspection, as every Bell is reliable and first-class. We can supply them in Plain Finish or Highly Polished, and with or without Fancy Hangings. Price and Terms furnished free. Address,

The Buckeye Bell Foundry,

The E. W. Vanduzen Co., Prop's.

CINCINNATI, OHIO.



FUEL COAL AT BUFFALO.

Vessels Supplied with best Youghiougheny Pittsburg or Fairmount Coal at Lehigh Valley Docks or by Barge, at market prices.

We are independent Coal Dealers and have no connection in Fueling business, directly or indirectly, with any Coal shippers by lake.

HOWARD & CO.,

Telephone 1381. 15 White Building, BUFFALO, N.Y.

F. W. WHEELER,
President.

E. T. CARRINGTON,
Vice-President.

C. W. STIVER,
Secy. and Treas.

F. W. WHEELER & CO.,

WEST BAY CITY, MICH.

Builders of all kinds of METAL AND WOODEN SHIPS.

AMERICAN CHAIN CABLE WORKS.

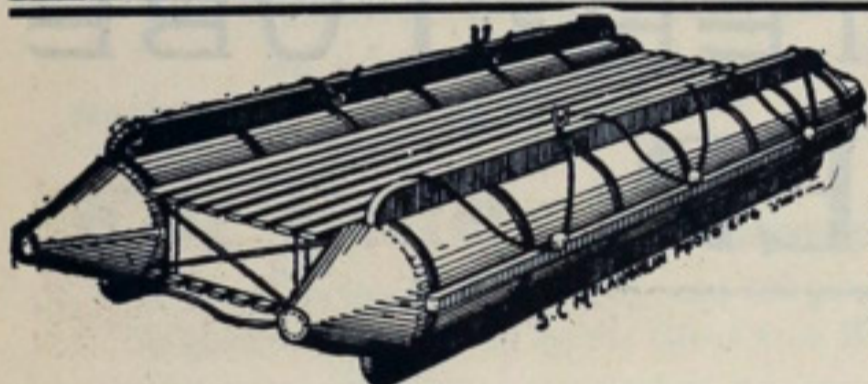
ESTABLISHED 1866.

Cable, Dredge, Quarry, Shipping, Crane and Rafting

CHAINS.

Our DREDGE and CRANE CHAINS are made of IRON ROLLED SPECIALLY for that purpose. Send for Price List.

J. B. CARR & CO., Manufacturers, TROY, NEW YORK.



Thos. Drein & Son,
BUILDERS OF

Metallic Life Boats and Rafts,
Government and Pleasure
Boats. Block and Granulated
Cork Life Preservers. Outfit
for Lake Steamers a Specialty.
TATNALL & RAILROAD STS.
Wilmington, Del.

IRA B. MANSFIELD.

Tel. Main 3769.

A. E. FINNEY.

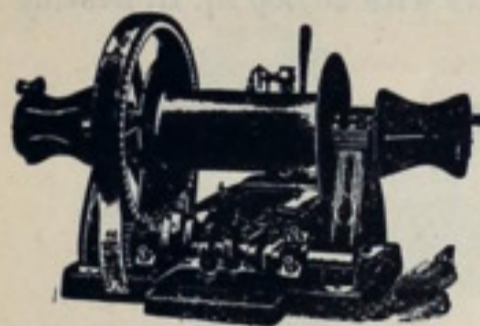
MANSFIELD & FINNEY,

Send your Mail in Our Care. Yucatan Cigar Store.
Telegraph and Messenger Calls in our Store.

Proprietors Marine Laundry.
Vessel Service a Specialty.

173 Jackson Street,

CHICAGO, ILL.



JACKSON & CHURCH,
Builders of DUPLEX HOISTING and DECK ENGINES.

Plain Finished and Automatic ENGINES, From Heavy Patterns at Moderate Prices.

Vertical, Horizontal, BOILERS Strictly First-Class and Highest Test.
Marine & Locomotive

Send for Circulars and Prices. SAGINAW, MICH.

THE "CINCINNATI"

AUTOMATIC

STEAM STEERING GEAR

A Simple, Powerful Machine. Noiseless and Sure.

SEND FOR
CIRCULAR.

FRONTIER IRON WORKS,
DETROIT, MICH.

H. CHANNON COMPANY

AGENTS FOR

RYLANDS BROS.

MANUFACTURERS OF

ENGLISH GALVANIZED STEEL HAWSERS.

24-26 Market Street, CHICAGO, ILL.



HOWARD H. BAKER & Co.

Ship Chandlers and Sail Makers,

18 to 26 Terrace. BUFFALO, N.Y.

WARRINGTON WATER TUBE BOILER.

The most economical boiler in existence.
Every tube accessible for cleaning and repairs.
No joints in the fire.

MANUFACTURED BY

GEORGE WARRINGTON,

86 N. Clinton St., CHICAGO.

Send for Illustrated Catalogue.

OFFICE OF THE LIGHT-HOUSE Engineer,
Ninth District, Detroit, Mich., Nov. 14,
1895. Sealed proposals will be received at this
office until 3 o'clock p. m. of Thursday, the 5th
day of December, 1895, for the construction and
delivery of the metal work for the Porte des
Morts Range Light-Tower, Michigan. Plans,
specifications, forms of proposal, and other in-
formation may be obtained on application to
this office. The right is reserved to reject any
or all bids, and to waive any defects. M. B.
ADAMS, Major, Corps of Engineers, U. S. A.,
Light-House Engineer, Ninth District.

Nov. 28

The Martin-Barriss Co.

IMPORTERS AND MANUFACTURERS OF

Mahogany, White Mahogany,

AND ALL NATIVE CABINET WOODS.

HIGH GRADES OF KILN DRIED WOODS FOR
CABIN WORK AND INSIDE TRIM.

White Oak Timbers and Plank

CONSTANTLY ON HAND AND SAWED TO ORDER
ON SHORT NOTICE.

654 Seneca Street,

Cleveland, Ohio.

DETROIT SHEET METAL AND BRASS WORKS.

Marine Coppersmiths, Pipe Fitters and Metal Workers.

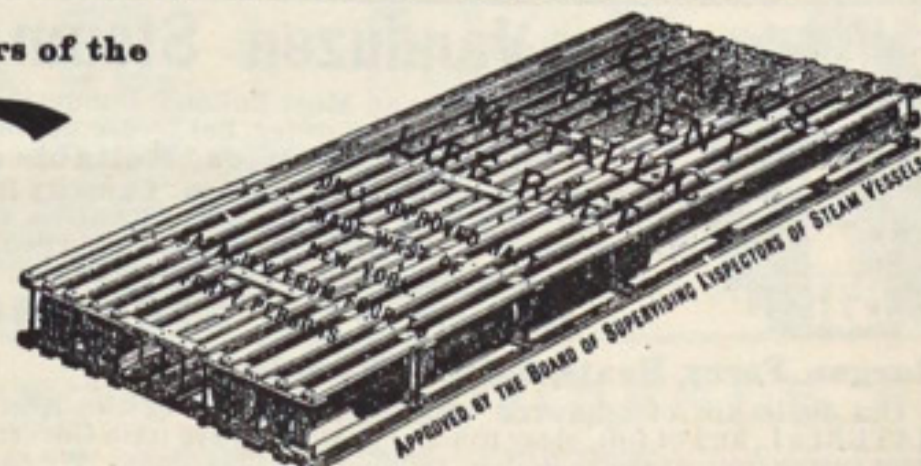
Sole Manufacturers of the

CLARK

PATENT

METALLIC

LIFE RAFT.



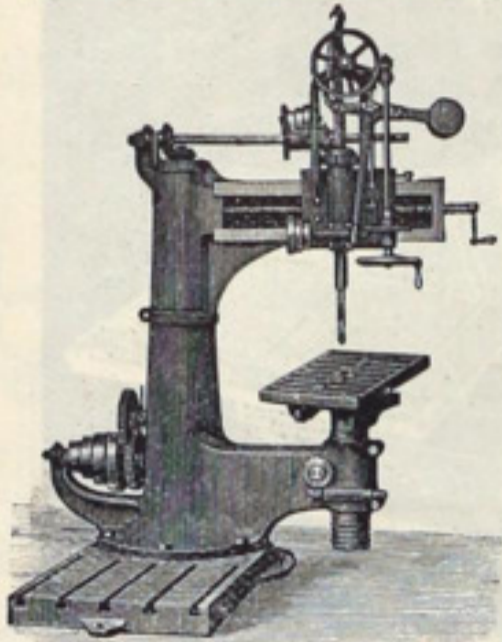
Agents for WORTHINGTON STEAM PUMPS.

Works, 64 to 72 Orleans St., DETROIT, MICH.

DIXON'S Graphite Pipe Joint Compound

Enables you to MAKE A TIGHTER JOINT than you can possibly make with red lead. You can do it easier, and parts can be separated at any time without breaking anything. Send for sample and circular.

JOS. DIXON CRUCIBLE CO., JERSEY CITY, N. J.

**Bement, Miles & Company,**

PHILADELPHIA, PA.

MANUFACTURERS OF

Metal Working Machine Tools

For Ship Yards, Railroad Shops,
Locomotive and Car Builders,
Machine Shops, Rolling Mills,
Steam Forges, Boiler Shops,
Bridge Works, etc., etc.

Steam Hammers, Steam and
Hydraulic Riveting Machines.

New York Office: Taylor Bldg. No. 39 Cortlandt St.
Chicago Office: 1534 Marquette Building.

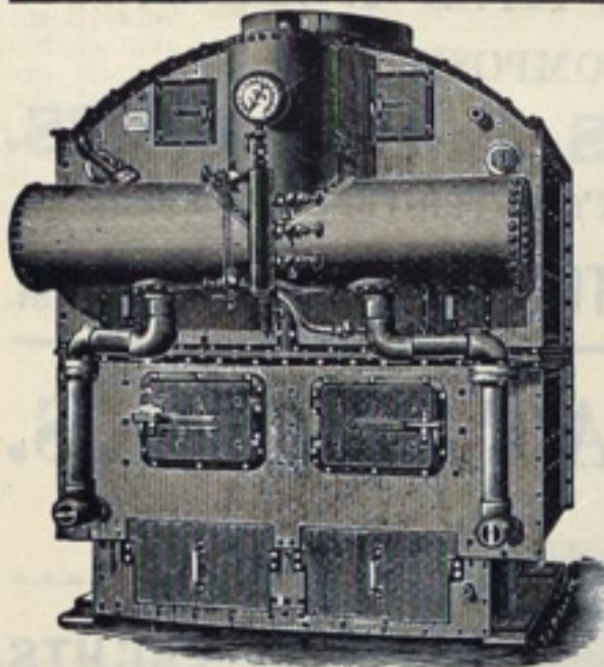
W. & A. FLETCHER CO.

NORTH RIVER IRON WORKS.

Marine Engines, Boilers, &c.

Hudson, 12th and 14th Streets, Hoboken, N. J.

Take Ferry from Foot of West 14th Street, N. Y.

**ALMY'S PATENT**

SECTIONAL

Water-Tube Boilers.

NOW USED IN

18 Passenger Boats from 70 to 160 feet long.

27 Steam Yachts from 50 to 160 feet long.

U. S. Torpedo Boat "Stiletto."

Numerous Small Launches and Stationary
Boilers are giving most excellent results.

ALMY WATER-TUBE BOILER CO.,

No. 178-184 Allens Avenue,
near Rhodes St.

PROVIDENCE, R. I.

GEORGE B. CARPENTER.

ESTABLISHED 1840.

BENJAMIN CARPENTER

GEO. B. CARPENTER & CO.**Ship Chandlers and Sail Makers.**

CORDAGE, TWINES, COTTON DUCK,
MILL, RAILROAD and VESSEL SUPPLIES.

202, 204, 206, 208 So. WATER STREET,
CHICAGO, ILL.

1880.

1893.

**CHAS. H. POTTER & CO.,
Investment Bankers,
Cleveland, O.**

Dealers in

Lake Superior Iron Mining Stocks,

on about 10 per cent. annual dividend basis, Republic Iron Co., Lake
Superior Iron Co., Champion Iron Co., Minnesota Iron Co., Jackson Iron
Co., Cleveland-Cliffs Iron Co., Chandler Iron Co., Chicago and Minne-
sota Ore Co.

O. H. McCUTCHEON,

(Successor to SAMUEL McCUTCHEON.)

**Copper, Tin and Sheet Iron Manufactory,
Steamboat and Engineers' Supplies.**

All kinds of Brass Cocks, Globe Valves and Couplings, &c. Iron Pipe and Fittings, and
Mill Supplies. Rubber Belting, Hose and Packings, Springs, Valves, &c.,
Leather Belting and Usudurian Packing.

Telephone No. 68.

No. 18 Ohio Street, BUFFALO, N. Y.

DIXON'S Lubricating Graphite

Is fully explained in an INTERESTING AND INSTRUCTIVE
PAMPHLET which is FREE to all interested. It will pay all
Engineers and Machinists to SEND FOR IT.

JOS. DIXON CRUCIBLE CO., JERSEY CITY, N. J.

Alfred B. Sands & Son**Yacht Plumbers.**

MANUFACTURERS OF

YACHT PLUMBING SPECIALTIES.

Pump Water Closets, for above or below
water line.

Folding Lavatories, Ventilators, Pumps,
Deck Plates, Etc.

134 Beckman St., NEW YORK.

NEVER SINK CORK JACKET AND LIFE BELT.

Warranted 24 lb. Buoyancy and full Weight of Cork, as required by U. S. Inspectors.
Consolidated Cork Life Preservers. Superior to all others. Ring Buoys and Fenders.

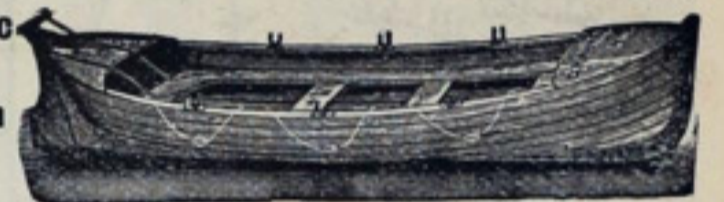
SAFEST, CHEAPEST. Approved and adopted by U. S.
Board of Supervising Inspectors.

Also adopted by the principal Ocean, Lake and River
Steamer Lines as the only Reliable Life Preserver. Vessels
and the trade supplied. Send for catalogue.

Awarded four Medals by World's Columbian Exposition



Metallic
and
Wooden
Life
Boats.

**Metallic Life Rafts, Marine Drags.**

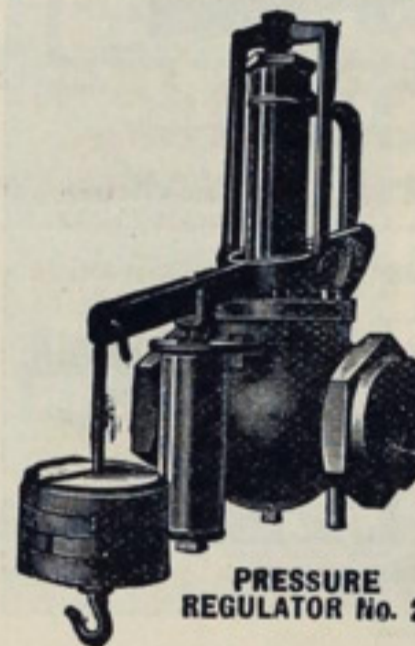
Manufacturer of Woolsey's Patent Life Buoy, which is the
lightest, cheapest and most compact Life Raft known.

Send for Illustrated Catalogue.

Get our prices before buying elsewhere.

D. KAHNWEILER,

437 Pearl Street, NEW YORK CITY.



PRESSURE
REGULATOR No. 2

**The "DAVIS" Pressure Regulator
and Reducing Valve.**

Is the simplest and best for reducing the pressure to
Steam Steering Engines, Donkey Engines, Steam
Winches and all places requiring a uniform pressure
below that of boilers.

No diaphragms, spring or packing.

Cut shows scale weights. We can furnish lever and
sliding ball weight if preferred.

MANUFACTURED BY

G. M. DAVIS & CO.

106 N. Clinton St., CHICAGO, ILL.

FOR SALE BY

R. E. Hills, Chicago.

U. H. McCutcheon, Buffalo.

Geo. Worthington Co., Cleveland.

P. M. Church, Sault Ste. Marie. Jas. Walker & Son, Detroit

Jas. Clements & Son, Bay City, Mich.

Cleveland Ship Building Co., Cleveland.

Chicago Ship Building Co., Chicago.

Paint your
Vessels with

**Superior Graphite Paint.**

NO BLISTERING, CRACKING OR SCALING.

Made especially for Stacks, Decks, Sides, Hulls and Water Com-
partments. Strictly anti-rust, and most durable
and economical.

DETROIT GRAPHITE MFG. CO., 541 River St., Detroit, Mich.

SHERIFFS STEAM STEERER.

MADE IN TWO SIZES.

Are easy to adjust and can
be handled by any one.

The Steerer can be arranged
to set in pilot house or aft.

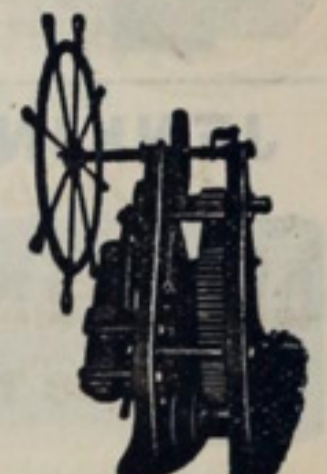
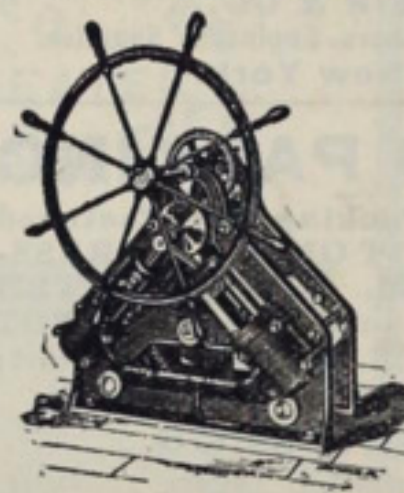
No Steerer will be sold with-
out a quadrant.

Steerer will be sold on ap-
proval.

Manufactured by

SHERIFFS MFG. CO.

126-130 Barclay Street,
MILWAUKEE, WIS.



McMYLER MANUFACTURING CO., 180 COLUMBUS STREET, CLEVELAND, O.

— SOLE MAKERS OF THE —

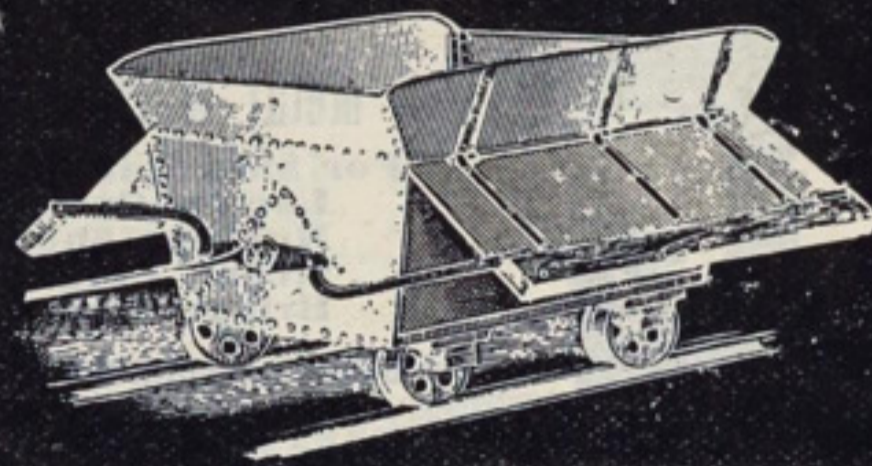
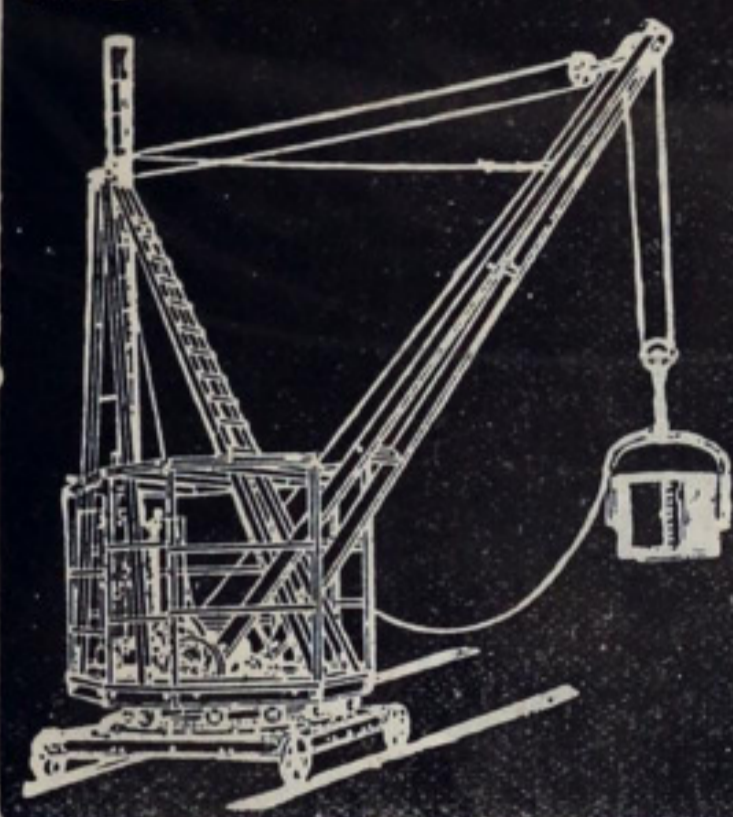
McMYLER PATENT REVOLVING STEAM DERRICK

FOR HANDLING COAL, ORE AND COARSE FREIGHT OF ANY DESCRIPTION.

This Derrick can Lift Load, Alter the Radius of Boom, Swing in Either Direction at Will of Operator, and can Propel Itself on Track any Desired Distance.

BUILT FOR ANY CAPACITY WANTED

**BUILDERS OF
CONVEYORS, COAL BUCKETS, ORE
BUCKETS AND DUMP CARS.**



THE Swain Wrecking Co.
E.M. PECK, Pres.

The TUG FAVORITE.
STATIONED AT CHEBOYGAN, MICH.
WITH COMPLETE WRECKING OUTFIT
IN CHARGE OF
CAPT. MARTIN SWAIN

THE CANADIAN WRECKER SAGINAW
STATIONED AT DETROIT, MICH.
ENABLES US TO WRECK IN CANADIAN
WATERS.

STEAM PUMPS AND SUB-MARINE
WORK IN CHARGE OF
JOHN S. QUINN.
Address all communications to
PARKER & MILLEN
OFFICE IS AT WATER ST. WEST,
DETROIT, MICH.

4 STEAM PUMPS, 10 JACKS, 3 HAWSERS.

1 COAL AND ORE PUMP
3-12 INCH ROTARY,
1-14 INCH WORTHINGTON.

DIVING RIGS
AND
DIVERS ABOARD
AT ALL TIMES

1895		October		1895	
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
6	7	8	9	10	11
13	14	15	16	17	18
20	21	22	23	24	25
27	28	29	30	31	

10-100 TON JACKS.
1-12 INCH HAWSER
1-10
1-9

TELEGRAPH
PARKER & MILLEN,
DETROIT, MICH.

The Bertram Engine Works Co. (LIMITED.)

ENGINEERS AND SHIP BUILDERS.

MARINE ENGINES AND BOILERS.

STEEL AND COMPOSITE

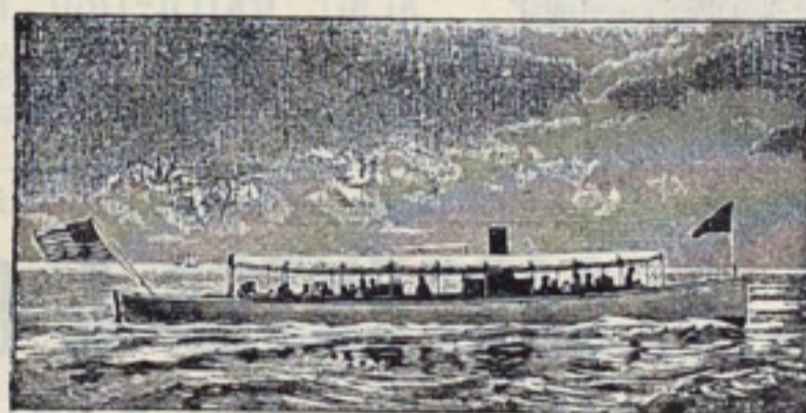
STEAMERS, TUGS and YACHTS.

ROBERTS AND MOSHER SAFETY WATER-TUBE BOILERS.

Office and Works: **NIAGARA & BATHURST STS., TORONTO, ONT.,** Ship Yard: **FOOT OF BATHURST ST.**

DETROIT BOAT WORKS.

STEEL
and
WOODEN



YACHTS
and
LAUNCHES.

BUILDERS OF **ELECTRIC LAUNCHES, DETROIT, MICH.**

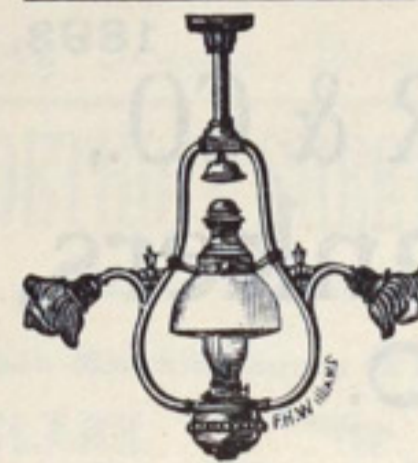
Any Class Wooden, Iron or Steel Boats up to 150 ft. in length.

YAWLS. METALLIC LIFE BOATS. LIFE RAFTS.

All kinds of Small Pleasure Boats.

The electric launches used on the lagoons at World's Fair were manufactured by this company.

Send for new illustrated Catalogue of electric launches.



SHIP LAMPS.

OIL AND ELECTRIC FIXTURES

FOR **Steamships, Yachts, &c.**

GREAT VARIETY OF DESIGNS.

Prices and Cuts on Application.

PAGE BROS. & CO.,

(FORMERLY WILLIAMS, PAGE & CO.)

227 to 233 Cambridge St.,

BOSTON, MASS.

P. M. CHURCH & CO.,

SAVINGS BANK BLOCK,

SAULT STE. MARIE, MICH.

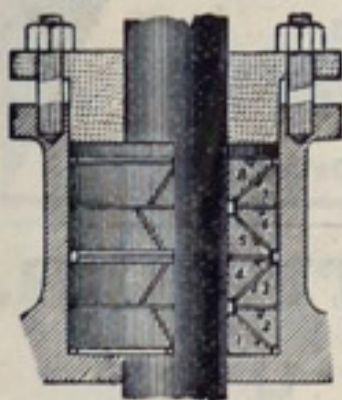
LEADING DEALERS IN

Ship Chandlery,

Marine Hardware, Paints, Oils, Packings, Cordage, Etc

FIRST-CLASS COPPERSMITH AND TINSHOP IN CONNECTION.

KATZENSTEIN'S Self-Acting METAL PACKING,



For PISTON RODS, VALVE STEMS, etc., of every description, for Steam Engines, Pumps, etc., etc.

Adopted and in use by the principal Iron Works and Steamship Companies, within the last twelve years, in this and foreign countries.

FLEXIBLE TUBULAR METALLIC PACKING, for slip-joints on Steam Pipes, and for Hydraulic Pressure; also METAL GASKETS for all kinds of flanges and joints.

DOUBLE-ACTING BALANCED WATER-TIGHT BULKHEAD DOORS for Steamers. Also Agents for the McColl-Cumming PATENT LIQUID RUDDER BRAKE. For full particulars and reference, address:

L. KATZENSTEIN & CO.,

General Machinists, Brass Finishers, Engineers' Supplies.

357 West St., New York.

JENKINS STANDARD PACKING

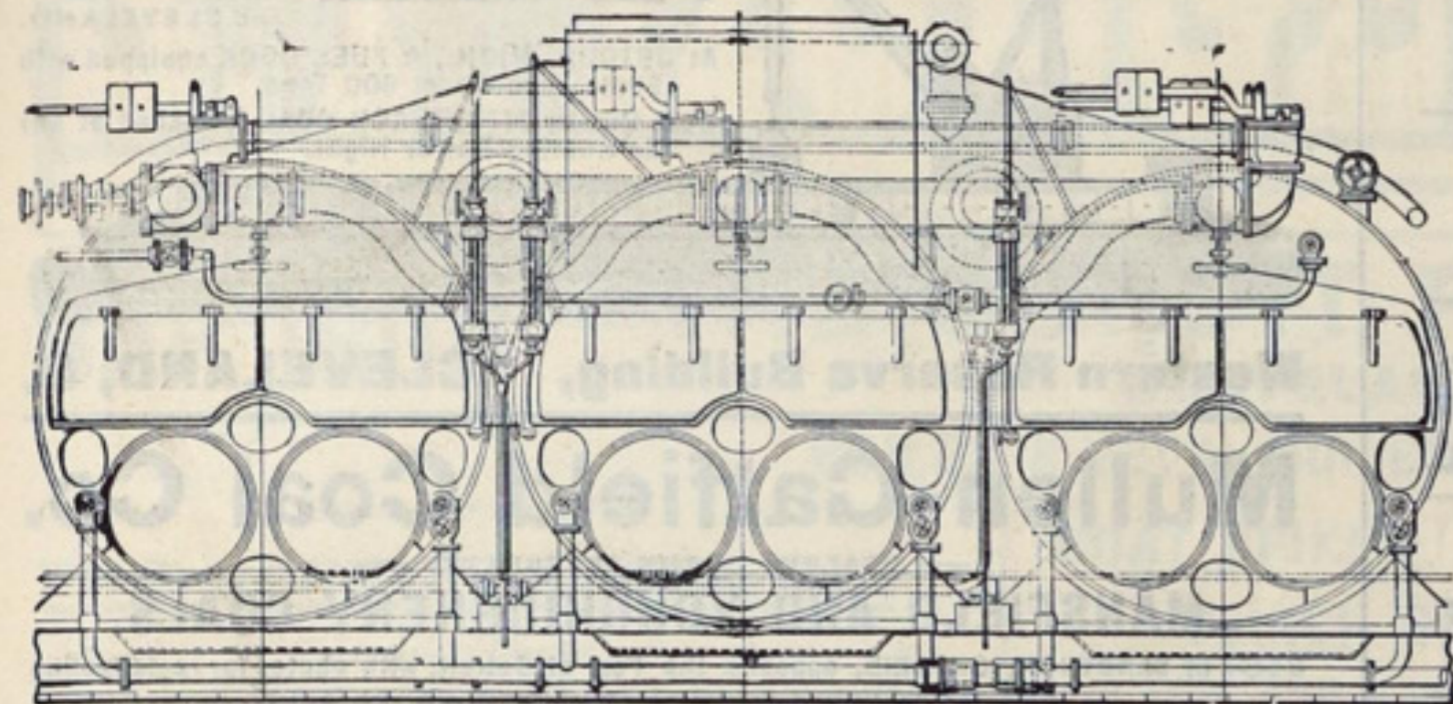


is the ONLY Packing manufactured that WILL LAST ON HIGH PRESSURE STEAM, SUPERHEATED STEAM, oils, acids, etc. Does NOT DETERIORATE, ROT or BURN out; therefore the best for all purposes.

JENKINS BROS.,

New York, Philadelphia, Chicago, Boston.

LAKE ERIE BOILER WORKS, BUFFALO, N. Y.



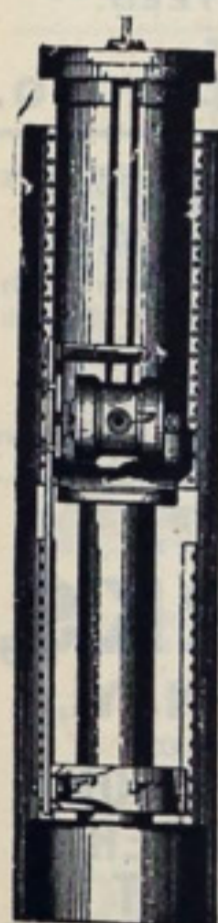
THE BEST EQUIPPED PLANT
IN AMERICA

FOR THE MANUFACTURE OF

MODERN MARINE BOILERS.

MARINE REVIEW DIRECTORY OF THE MORE IMPORTANT DRY DOCKS ON THE GREAT LAKES.

PLACE.	NAME OF DOCK.	LENGTH.		WIDTH.		Depth on Sill.	REMARKS.
		On blocks.	Over all.	Gate.	Top.		
Buffalo, N. Y.	Union Dry Dock Co.	340	348	58 1/4		9	To be 400 feet on blocks and 17 feet over sill. Timber.
Buffalo, N. Y.	do	341	349	45		14	
Chicago, Ill.	Chicago Ship Building Co. (Calumet)	445	470	70	100	18	
Cleveland, Ohio	Ship Owners Dry Dock Co.	450	465	50		17	
Cleveland, Ohio	do	325	340	55		14	
Cleveland, Ohio	Cleveland Dry Dock Co.	340	360	50	88	2 1/2	
Detroit, Mich.	Detroit Dry Dock Co.	365	378	79	90	16	Timber.
Detroit, Mich.	do	245	245	48	48	8 1/4	Timber.
Port Huron, Mich.	Dunford & Alverson Dry Dock Co.	392	412	62	95	18	Graving.
Port Huron, Mich.	do	255	270	50		6	Graving.
Toledo, Ohio	Craig Ship Building Co.	200	250	45		8	Marine Railway (1,500 tons) also.
Toledo, Ohio	do	400	425	60		16	To be ready June 1.
West Superior, Wis.	American Steel Barge Co.	554	500			20	



A. J. DUPUIS,

16 Atwater Street W., DETROIT, MICH.,
CONTRACTOR FOR

Dock Building, Bridge and Trestle Work,

Pile Driving and Foundation Work.

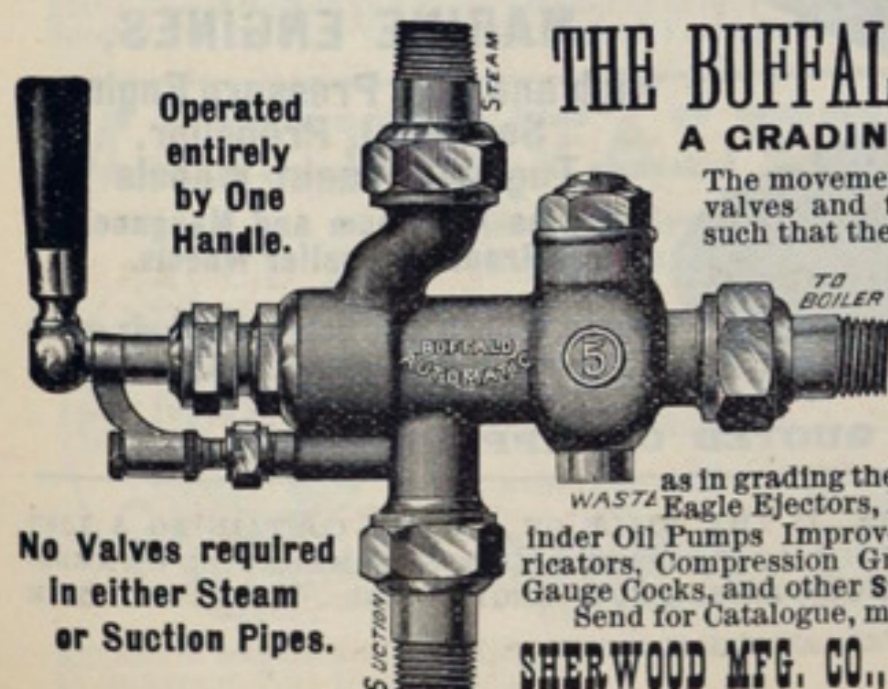
Dry Dock Building; builder of Detroit Dry Dock Co's
New Dry Dock.

PATENTEE AND MANUFACTURER OF

Dupuis Steam Pile Driving Hammer,

Which is very effective, in that it is forced by steam in the down stroke, (which is not the case in other pile drivers), making the ram strike a quick and powerful blow. One advantage of this Hammer over others is, that the steam hose is inside the leaders, and not in the way of hoisting the piles as is the case in other steam hammers.

TWO SIZES of these Hammers are made, one weighing 5000 lbs. and one 7000 lbs. THE WORKING OF HAMMERS GUARANTEED.



THE BUFFALO AUTOMATIC.
A GRADING INJECTOR.

The movement of the steam and water valves and their relative positions are such that the supply of water will always be in proportion to the supply of steam admitted to the jets. CAN BE GRADED to run continuously on any steam pressure from 20 to 140 lbs. Operated entirely by one handle, both in stopping and starting, as well

as in grading the supply of steam and water. Eagle Ejectors, Duplex Tube Scrapers, Cylinder Oil Pumps Improved Glass Oil Cups and Lubricators, Compression Grease Cups, Improved Ball Gauge Cocks, and other Steam Users' Specialties. Send for Catalogue, mentioning this paper.

SHERWOOD MFG. CO., (Sole Mfrs.) BUFFALO, N. Y.

H. E. STEVENS.

J. T. MEAD.

LEWIS S. PRESLEY

BUCKEYE STEAM FITTING CO. Manufacturers of Improved Giant Flue Scraper.

STEAM FITTERS. ENGINEERS' SUPPLIES.

'Phone 4058, 117 River Street, CLEVELAND, OHIO.

"The most perfect feed water heater and purifier we ever saw."—R. HAMMOND.

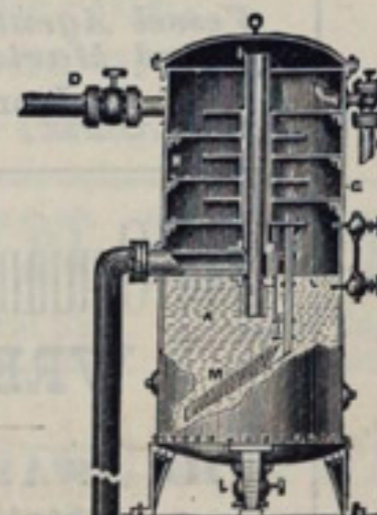
IN PRACTICAL USE ON 25 LAKE STEAMERS.

Every Purifier Warranted to Remove all Sediment or Scale-Forming Substance.

ROBERT LEARMONTH PATENTEE.

200 BOUCK AVENUE, - - - - - BUFFALO, N. Y.

THE BUFFALO
FEED WATER
HEATER
AND PURIFIER.



REFERENCES.

- A.—Settling chamber.
- B.—Boiler.
- C.—Feed pipe to boiler.
- D.—Steam pipe.
- E.—Water supply pipe.
- F.—Check valve.
- G.—Spray disks.
- H.—Spray chamber.
- I.—Equalizing tube.
- J.—Blow-off pipe.
- K.—Automatic shut-off valve.
- L.—Division plate.
- M.—Deflector and separator.

MARINE ENGINEERING
(Stationary and Locomotive Engineering), Electricity, Architectural and Mechanical Drawing, Plumbing, Heating, Mining, English Branches, etc.
TAUGHT BY MAIL.
Engineers can qualify to obtain licenses. To enroll only necessary to know how to read and write. Circular free. State subject you wish to study. The International Correspondence Schools, SCRANTON, PA.

HARVEY D. GOULDER,

LAWYER AND PROCTOR IN ADMIRALTY,
CLEVELAND, O.

C. F. PALMER,
CAPT. J. A. CALBICK,
W. H. COOK.

PALMER, COOK & CALBICK,
Vessel Agents and Underwriters.

Tel. Harrison 689. 108 & 109 Royal Insurance Bldg., CHICAGO, ILL.

H. R. SPENCER,

ATTORNEY AT LAW and PROCTOR IN ADMIRALTY.
218 Superior St., DULUTH, MINN.

C. E. KREMER, Attorney and Counselor-at-Law and
Proctor in Admiralty.

Rooms 14, 15 and 16, Bryan Block, 164 LA SALLE ST., CHICAGO, ILL.

BROWN & COOKE,

Counselors at Law and Proctors in Admiralty,
106-107-108 White Building, BUFFALO, N. Y.

JOHN MITCHELL.

JOHN F. WEDOW.

ALFRED MITCHELL.

MITCHELL & CO.,

Vessel and Insurance Agents,
508, 509 and 510 Perry-Payne Building, CLEVELAND, OHIO
Office Telephone, 737. Residence, John Mitchell, 3506.

C. R. JONES & CO., VESSEL AGENTS,
FIRE AND MARINE INSURANCE.

Nos. 501, 502 and 503 Perry-Payne Bldg., CLEVELAND, O.

H. C. WISNER, EX-LIEUT. U. S. NAVY.
Counsel and Proctor in Admiralty.
MARINE BUSINESS A SPECIALTY.

Telephone 233. 22-23 Moffat Block, DETROIT, MICH.

C. A. MACDONALD.

J. J. RARDON.

C. A. MACDONALD & CO., GENERAL
INSURANCE AGENTS.

Rialto Building, CHICAGO, ILL.

Capt. LYMAN HUNT. JAMES P. HUNT.

L. HUNT & SON,
Vessel Brokerage & Marine Insurance,
Room 9, Exchange Building.
Telephone No. 522.
No. 202 Main St., BUFFALO, N. Y.

H. S. LORD.

J. H. NORTON.

LORD & NORTON,

Attorneys-at-Law,
Proctors and Advocates in
Admiralty,
DULUTH, MINN.

White, Johnson & McCaslin,
ATTORNEYS-AT-LAW,

Proctors in Admiralty,
26-27 Blackstone Building,
CLEVELAND, - OHIO.

THOS. WILSON,

MANAGING OWNER

WILSON'S TRANSIT LINE.
Gen. Forwarder.
Freight and Vessel Agent.
CLEVELAND, O.

C. F. Palmer.

C. L. Hutchinson.

PALMER & CO.,

Vessel Agents and Underwriters,
515 Perry-Payne Bldg., Cleveland, Ohio.
Telephone 644.

W. A. HAWGOOD.

C. C. CANFIELD.

HAWGOOD & CANFIELD,
Vessel Agents and Marine Insurance,
604-606 Perry-Payne Bldg.,
Cleveland, - Ohio.
Telephone No. 2395.

ORESTES C. PINNEY,
Lawyer and Proctor in Admiralty.
Rooms 722 and 723 Perry-Payne Bldg.
CLEVELAND, OHIO.
Telephone 2585.

C. W. ELPHICKE. JAS. A. MYERS.
A. L. FITCH.
C. W. ELPHICKE & CO.
GENERAL INSURANCE AGENTS.
Room 10, No. 6 Sherman St., Chicago, Ill.

H. J. WEBB & Co.
SHIP BROKERS, VESSEL OWNERS and AGENTS,
Established in 1856. H. J. Webb & Co.
will charter vessels for the lake trade.
Special attention given to chartering ves-
sels in the Lake Superior Iron Ore trade,
both for the season and single trip.
No. 606 & 607 Perry-Payne Building,
Cleveland, O. Office Telephone No. 338,
Residence No 3228.

J. T. ROSE.

FRANK B. LAZIER.

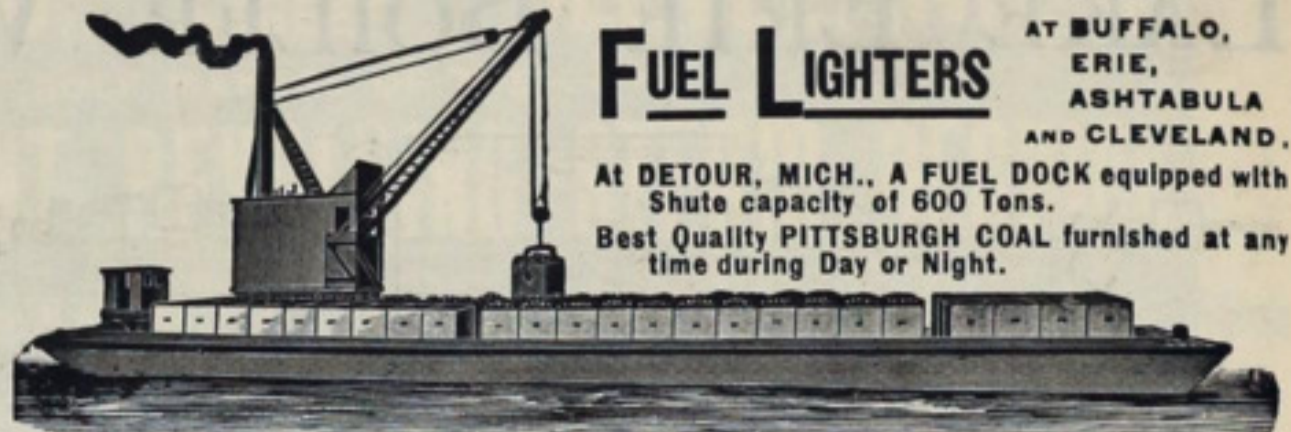
ROSE & LAZIER,
Vessel Agents and Brokers,
and Marine Insurance,
16 Board of Trade,
DULUTH, - MINN.

The Grummond Tug Line
WRECKING.

THE SWAIN
Stationed at the SOO
THE CHAMPION
Stationed at DETROIT.

U. GRANT GRUMMOND, Gen'l Mgr.
DETROIT, MICH.

Pickands, Mather & Co.,



FUEL LIGHTERS

AT BUFFALO,
ERIE,
ASHTABULA
AND CLEVELAND.

At DETOUR, MICH., A FUEL DOCK equipped with
Shute capacity of 600 Tons.
Best Quality PITTSBURGH COAL furnished at any
time during Day or Night.

Western Reserve Building, CLEVELAND, O.

Mullen-Gatfield Coal Co.

— DEALERS IN THE CELEBRATED —

MANSFIELD AND YOUGHIOGHENY COALS.

Docks at SANDWICH, ONTARIO, opposite the Fort at Detroit, with chutes for rapid fueling
Elevated docks and derrick at AMHERSTBURG, ONTARIO.

THE CUDDY-MULLEN COAL CO.
Dealers in COAL.

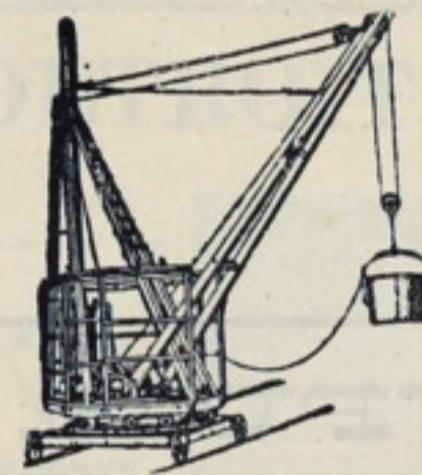
Docks at Government Pier, Whiskey Island, and Ad-
joining Globe Dry Dock.
All fully equipped with Revolving Derricks; also, Lighter Carrying Derrick
and One Hundred Two and One-Half Ton Buckets.
Main Office, 81 Perkins Building, East Side of Main Street Bridge.
Dock Office, 127 West River St., Cleveland, O. Telephone No. 8.
Boats Coaled Day and Night. Docks at Amherstburg,

Ohio & Pennsylvania Coal Co.

FUEL DEPARTMENT.
MINERS AND SHIPPERS,

Youghioghenny and Ohio Steam Coals. Steamboats, Tugs, etc., Coaled day or
night, DOCKS FOOT WEST RIVER STREET. WHISKEY ISLAND GOVERNMENT
PIER and C. & P. R. R. SLIPS. Also STEAM LIGHTER—Equipped with
Revolving Derrick and (100) two ton buckets.

Telephone 1608. Office, 130 West River St., CLEVELAND, OHIO.



TOLEDO FUEL CO.,

Cambridge, Hocking, Jackson
and Massillon Coal

Wheeled on or put on with DERRICK.
NIGHT OR DAY.

SATISFACTION GUARANTEED.

H. H. WILLIAMS, Manager.

Located on Penn. Dock, **TOLEDO, O.**

H. A. BARR, PRESIDENT, F. H. VAN CLEVE, SMC. CAPT. GEO. BARTLEY, SUPT.
Escanaba, Escanaba, Escanaba.

ESCANABA TOWING & WRECKING CO., Escanaba, Mich.

Tugs, Lighters, Steam Pumps, Hawseers, Hydraulic Jacks and Diving Appliances always ready
TUG MONARCH, Engine Compound, Cylinder 16 and 30 inches diameter, 30 inch-
Stroke, Steam Pressure Allowed, 125 pounds.
TUG DELTA, Cylinder 20 by 22, Steam Pressure Allowed, 105 pounds.
TUG OWEN, Cylinder 20 by 20, Steam Pressure Allowed, 104 pounds.

CENTRIFUGAL PUMPS, Seven and Fourteen Inch Suction

H. G. TROUT,
KING IRON WORKS,

BUFFALO, N. Y.,

MANUFACTURERS OF

TRIPLE EXPANSION,

THREE CYLINDER,

FORE AND AFT

And STEEPLE COMPOUND
MARINE ENGINES,

High and Low Pressure Engines,

Sectional Propeller.

Tug and Yacht Wheels.

Cowles Aluminum and Manganese
Bronze Propeller Wheels.

These Wheels are noted for their extra
speed, towing power and propor-
tionate saving of coal.

PRICES QUOTED ON APPLICATION.

"AROUND THE LAKES" IS THE TITLE OF A BOOK CONTAINING A LIST
OF ALL LAKE VESSELS WITH POST OFFICE ADDRESS OF MANAGING OWNERS.
ILLUSTRATIONS ALL HIGH-CLASS PHOTO-ENGRAVINGS. SOLD BY THE
MARINE REVIEW AT \$2.

S. F. HODGE & CO.

MARINE ENGINES, &
PROPELLER WHEELS,
DECK HOISTERS,
MARINE REPAIRS.
320 ATWATER STREET,
DETROIT, MICH.

BAR IRON THE CONDIT FULLER CO. PIG IRON

CLEVELAND, O.

BOILER RIVETS, BOILER TUBES, IRON PIPE,

SALES AGENTS:

THE CARBON STEEL CO.

MANUFACTURERS OF

ACID OPEN HEARTH STEEL

SHIP, BOILER, BRIDGE AND
TANK PLATES, &c., &c.

BOAT SPIKES,
CLINCH RINGS, &c.

HIGH GRADE MATERIALS FOR
VESSEL CONSTRUCTION
A SPECIALTY.

SALES AGENTS:

THE CAMBRIA IRON CO.

MANUFACTURERS OF

ACID OPEN HEARTH

AND BESSEMER STEEL

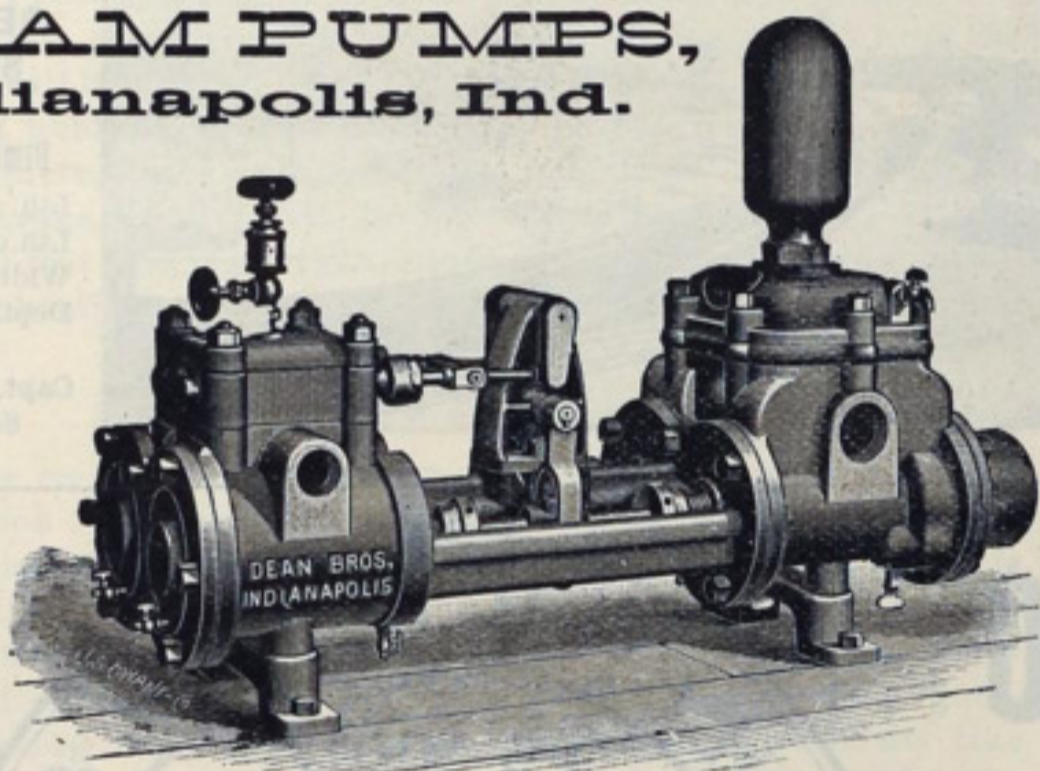
ANGLES, BARS, CHANNELS,
BEAMS, TEES, ZS, &c.

DEAN BROTHERS,

STEAM PUMPS,
Indianapolis, Ind.

Boiler
Feeders,
Air Pumps
and Con-
densers,
Ballast
Pumps,
Fire
Pumps,
Bilge
Pumps.

SEND FOR
CATALOGUE



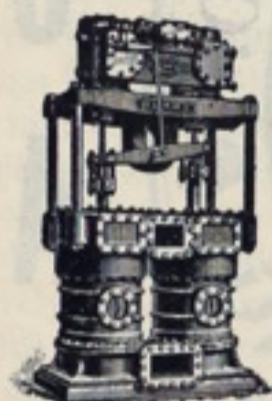
THE GEO. F. BLAKE MFG. CO.

BUILDERS OF

MARINE PUMPS

Single and Duplex Pumps for Boiler Feed,
Fire or Bilge Service—Vertical and Horizontal.
Vertical and Horizontal Pumps, Air Pumps
for Surface and Jet Condensers.

95 and 97 Liberty St., NEW YORK.



AIR PUMP ON
U.S. CRUISER NEW YORK.

SUBSCRIBERS WILL AVOID DANGER OF MISTAKES BY GIVING THE OLD
AS WELL AS THE NEW ADDRESS WHEN A CHANGE IS DESIRED.

JOHN HAUG, Consulting Engineer and Naval Architect.

Ship and Engineer Surveyor Lloyds Register, London.
Plans, Specifications and Superintendence of Ships and their Machinery.
Specialties—Bulk Oil Vessels High Speed Yacht Engines, etc.

206 Walnut
Place,
Philadelphia.

MARINE VALVE OIL FOR INTERNAL LUBRICATION. RENOWN ENGINE OIL FOR EXTERNAL LUBRICATION

Marine Valve,
Renown Engine,

Eldorado Engine,
Crank Case,

Victor Signal,
Dark Lubricating,

Mineral Seal,
Head Light,

Artic Cup Greases,
and Lard Oils.

— CARRIED IN STOCK AT THE —

STANDARD OIL COMPANY'S MARINE DEPOT,

TELEPHONE 77.

123 River Street, CLEVELAND, O. MAIN OFFICE TELEPHONE 682.

ALSO FOR SALE
BY
**STANDARD OIL
COMPANY,**

Chicago, Ill., No. 5 Wabash Ave.
Racine, Wis.
Milwaukee, Wis., Broadway & Mason.
Sheboygan, Wis.
Manitowoc, Wis.
Green Bay, Wis.

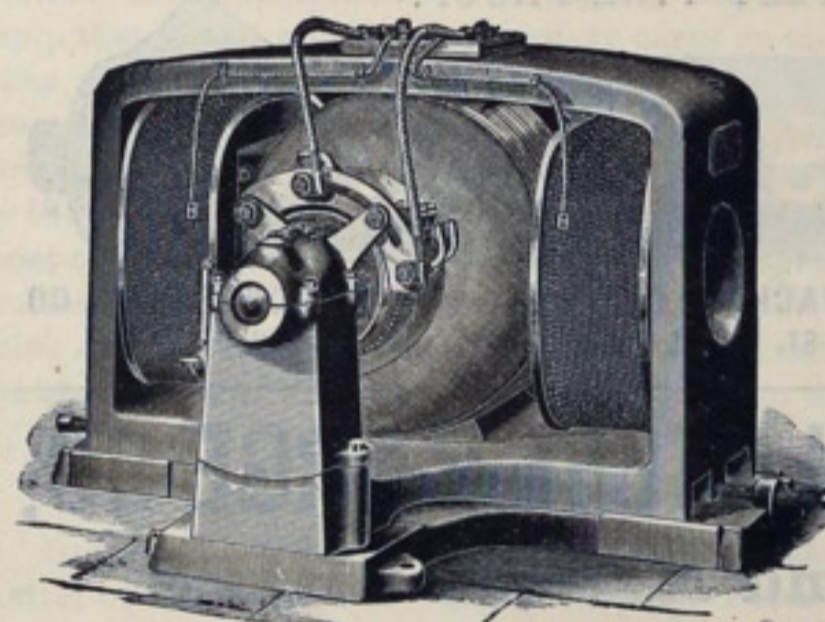
Marinette, Wis.
Oshkosh, Wis.
Duluth, Minn.
West Superior, Wis.
Hancock, Mich.
Marquette, Mich.

Buffalo, N. Y.
Sault Ste. Marie, Mich.
West Bay City, Mich., M.C. Ry. & 10th St.
Saginaw, Mich., Eighth & Sears Sts.
Detroit, Mich., 46 Jefferson.
Toledo, O., Summit & Monroe Sts.

A. H. MCGONAGIL, South Chicago, Ill.
MARINE SUPPLY Co., Fairport, O.
F. KRANZ, Sandusky, O.
THE M. I. WILCOX CORDAGE & SUPPLY Co., Toledo, O.

ATLANTIC REFINING COMPANY, French & 16th Sts., Erie, Pa.
D. ROBESON, Port Huron, Mich.
W. S. MCKINNON, Ashtabula Harbor, O.
HULL & RAND, Huron, O.

EDWARD BRAMMALL, Benton Harbor, Mich.
BABY & DALE, St. Clair, Mich.
N. C. ALTEN, Lorain, O.
A. F. HARRINGTON, Conneaut Harbor, O.



Electrical Supplies
—FOR—
..STEAMSHIPS..
A SPECIALTY.

The F. P. Little
Electrical Construction
and Supply Co.

No. 135 E. Seneca Street,
BUFFALO, N. Y.

Send for Catalogue

THE Bethlehem Iron Company

PRINCIPAL OFFICE and WORKS:

SOUTH BETHLEHEM, PENNA.

Steel Rails, Open Hearth, Bessemer and Nickel Steel
Billets and Forgings.

Hydraulic Forged Shafting, Hollow or Solid.
Cranks, Rolls, Etc.

Rough Machined or Finished. Fluid Compressed Steel.
GUNS and ARMOR.

NEW YORK OFFICE, 80 Broadway.
PHILADELPHIA OFFICE, 421 Chestnut St.
CHICAGO OFFICE, Marquette Bldg.

Complete Electric Plants for Light and Power

On STEAMSHIPS, WHALEBACKS, YACHTS, DOCKS, WHARVES, Etc.

Our system is complete in every detail. All our appliances are made to Governmental and Insurance requirements and are perfect. Write for prices and catalogues.

GENERAL ELECTRIC COMPANY.

SALES OFFICES: { Schenectady, N. Y. Chicago, Ill. Detroit, Mich. Buffalo, N. Y. Columbus, O. New York, N. Y.
Boston, Mass. Philadelphia, Pa. Baltimore, Md. Portland, Ore. San Francisco, Cal.

FRONTIER IRON WORKS

MARINE
ENGINES,
DETROIT, MICH

H. W. Johns' Boiler and Pipe Coverings.

ASBESTOS
MATERIALS
OF
ALL KINDS.

Wicking,
Fibre,
Mill Board,
Felt,
Packing,
Cement,
Liquid
Paints,
Roof Paints,
Fire-Proof,
Paints, etc.

Made in Sections Three Feet Long, to Fit
Every Size of Pipe.
ABSOLUTELY FIRE-PROOF.



THE CHASE MACHINE CO.

111 ELM ST.

CLEVELAND, O.

H. W. JOHNS MFG. CO.

59 WADE BLDG.

The Cleveland Dry Dock Co.

148 Elm St.,
Cleveland, O.

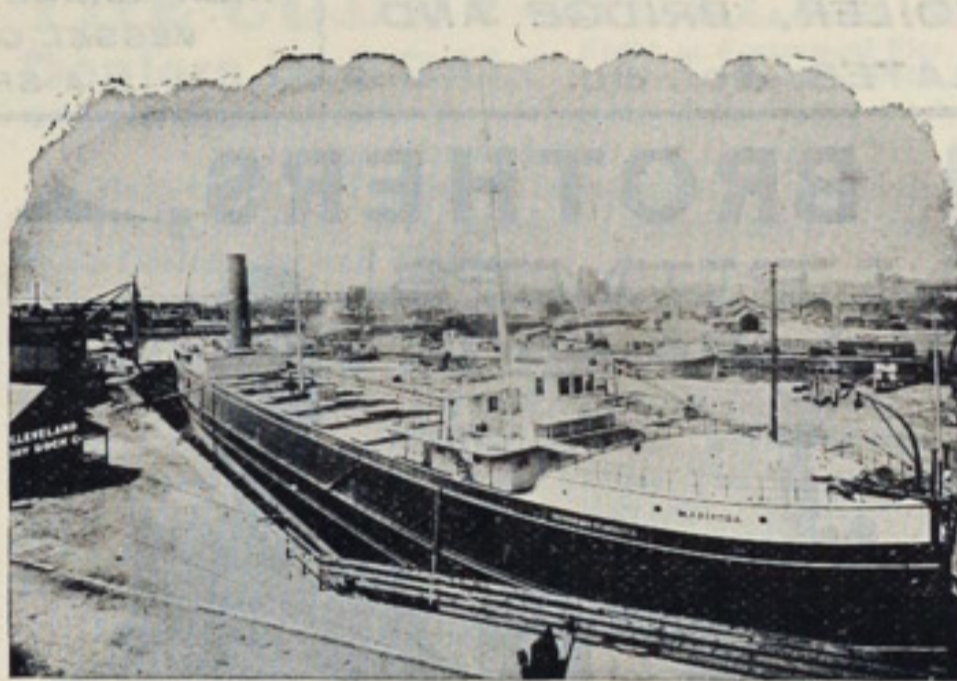
Telephone 1616.
Resid. Phone 4080.

REPAIRING A
SPECIALTY.

Dimensions of Dock:

Lth. over all, 360 ft.
Lth. on blocks, 340 ft.
Width of gate, 50 ft.
Depth over sill, 20 ft.

Capt. W. W. BROWN
Sec'y & Mgr.



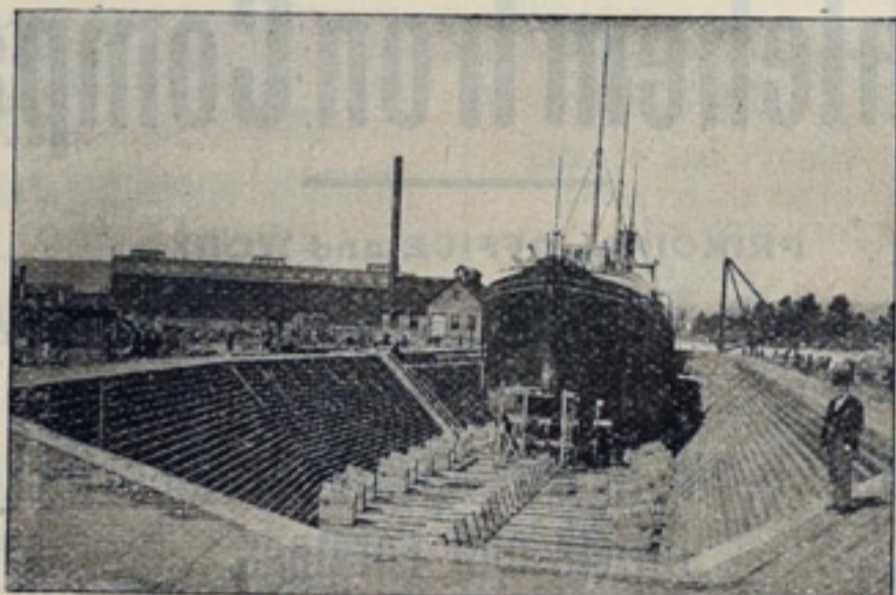
AMERICAN STEEL BARGE CO. STEEL and METAL SHIPS

Of all classes built on the Shortest Possible Notice at our yards at

West Superior, Wis., and also at Everett, Wash.

Photograph of 300 ft. Boat in Dock.

Plates &
Material
Always
on hand
to Re-
pair all
kinds of
Metal
Ships in
Shortest
Time.



Best
Quality
of Oak
instock
for Re-
pairing
Wooden
Vessels
of all
Classes.

SIZE OF DOCK.

Length, extreme.....537 feet.	Entrance, Top.....55 feet 9 in.
Breadth, Top.....90 " 4 in.	Entrance, Bottom.....50 "
Breadth, Bottom.....52 "	Depth over Sills.....18 "

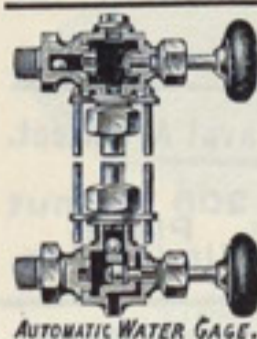
LARGEST DRY DOCK ON THE LAKES.

Prices for Repairs and Docking same as at lower lake ports

SUPERIOR, WIS.

A number of Propeller Wheels in stock at Dry Dock.

"ROPER'S LAND AND MARINE ENGINES," BOUND IN MOROCCO WITH FLAP AND POCKET, WILL BE MAILED TO ANY ADDRESS FOR \$3.50 SENT TO THE MARINE REVIEW, CLEVELAND, O.



AUTOMATIC WATER GAUGE.

— THE — PENBERTHY SPECIALTIES.

FOR THE BOILER AND ENGINE. ARE THE ENGINEERS' FAVORITES.
85,000 PENBERTHY AUTOMATIC INJECTORS in use, giving perfect satisfaction under all conditions. Our Jet Pumps, Water Gages and Oil Cups are Unequalled.
SEND FOR CATALOGUE. PENBERTHY INJECTOR CO. DETROIT, MICH.
BRANCH FACTORY AT WINDSOR, ONT.

WHEELER CONDENSER & ENGINEERING COMPANY,

39 and 41 CORTLANDT STREET, NEW YORK.

WHEELER'S IMPROVED SURFACE CONDENSERS

MOUNTED UPON COMBINED AIR AND CIRCULATING PUMPS.

Sole Proprietors and Manufacturers of the

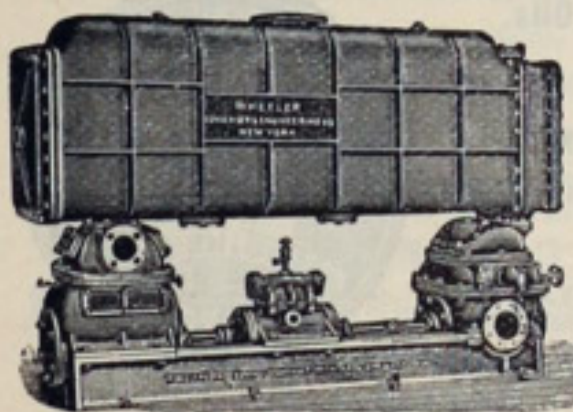
Wheeler Standard Surface Condenser.

Wheeler Admiralty Surface Condenser.

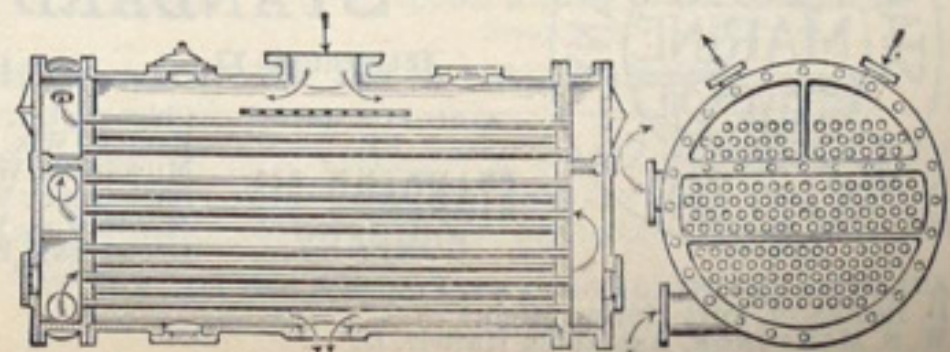
Wheeler Lighthall Surface Condenser.

Volz Patent Combined Surface Condenser
and Feed Water Heater.

Wheeler's Improved Marine Feed Water Heater.



Wheeler Surface Condenser.
Mounted on Combined Air & Circulating Pumps.



Patent Combined Surface Condenser & Feed-Water Heater